A STUDY TO ASSESS THE EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON PREVENTION OF BLOOD STREAM INFECTION FOLLOWING CENTRAL VENOUS CATHETER INSERTION AMONG STAFF NURSES WORKING IN SELECTED HOSPITALS AT COIMBATORE

By

Reg. No:301411104

A DISSERTATION SUBMITTED TO THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING.

OCTOBER (2016)

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EXTERNAL INTERNAL

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CHAPTER-I

INTRODUCTION

"To succeed... you need to find something to hold on to, something to motivate you, something to inspire you."

Tony Dorsett

Introduction

World Health Organization (WHO) stated that health is a complete physical mental and social wellbeing and not merely the absence of disease or infirmity .Good health is a prerequisite to human productivity and development process. Health is vital for ethical, artistic, material and spiritual development of man. Good heath is a basic right and produces civic consciousness. (WHO 2013).

In medicine, a central venous catheter (CVC), also known as a central line, central venous line, or central venous access catheter, is a catheter placed into a large vein. Catheters can be placed in veins in the neck (internal jugular vein), chest (subclavian vein or axillary vein), groin (femoral vein), or through veins in the arms (also known as a PICC line, or peripherally inserted central catheters). It is used to administer medication or fluids that are unable to be taken by mouth or would harm a smaller peripheral vein, obtain blood tests (specifically the "central venous oxygen saturation"), and measure central venous pressure. (Schneider, 2009).

Intravascular devices are invaluable in modern day medical practice. They are used to administer IV fluids, medications, blood products, parental nutrition, and to monitor the haemodynamic status of critically ill patients. However the use of intravascular devices frequently is complicated by a variety of local or systemic infections. Approximately 5 million central venous catheters are inserted per year, and

of these 3-8% lead to blood stream infection. The attributable mortality of these bloodstream infections is 12-25%. A significant proportion of non-ICU patients have central venous catheters (e.g. patients on haematology, oncology wards), and many patients are discharged with central venous catheters in place. These patients are also at risk for serious catheter related infections (Glob can, 2010).

Health care-associated infections (HAIs) are an important cause of morbidity and mortality, and place a significant economic burden on the health care system. An estimated 1.7 million HAIs, or 4.5 infections per 100 hospital admissions, occurred in the United States in 2002, resulting in nearly 100,000 deaths. There are bloodstream infections (BSIs), most of which are associated with central venous catheters (CVCs), account for 11% of all HAIs. Agencies such as the National Healthcare Safety Network of the Centres for Disease Control and Prevention (CDC) were formed in response to the growing awareness of HAIs as an urgent public health and patient safety issue (Lewis, 2008).

Catheter-related bloodstream infection remains the most serious complication of central venous access and a leading cause of nosocomial infection in the ICU. Infection remains the main complication of intravascular catheters in critically ill patients. Catheter-related bloodstream infections have been reported to occur in 3 to 8% of inserted catheters and are the first cause of nosocomial bloodstream infection in intensive care units (ICUs). Coagulase-negative staphylococci are the most common micro organisms associated with catheter-related bloodstream infections. Educating and training of health-care providers (staff nurses) who maintain central venous catheters is essential for preventing catheter-related infection, improving patient outcomes, and reducing healthcare costs. (Black 2007).

Indian health care industry suffers from major drawbacks - the picture as of today is of scarcity amidst abundance. There is water everywhere, yet not a drop to drink. There is vast material available, there are people who are working and data is being produced, yet this is not standardised across, is non uniform and thus cannot be put to mass use for improvement (Barbara, 2011).

Though a prospective study of intermediate-term central catheters in children reports rates of catheter associated bloodstream infection of 1.3/1000 catheter days anecdotally, rates are felt to be much higher in most Indian ICUs. Central venous catheters are now widely used in Indian intensive care units. They are used as vascular access for hemodynamic monitoring, parenteral nutrition, and the administration of fluids and drugs. However, these central venous catheters amplify the risk for local and systemic infections and increase the mortality rates of patients.

Need for the study

"When you realize that you know very little then you will fit for learning"

People with life-threatening injuries and illnesses need critical care. Placement of an intravenous (IV) catheter is one of the most common invasive procedures performed in critical care unit. Central venous catheters, also known as central venous access devices, are used to administer large amounts of intravenous (IV) fluids. Now, nurses in all areas of healthcare are taking care of patients with central venous catheters. According to the Centres for Disease Control and Prevention, approximately 2, 50,000 central venous catheter-related bloodstream infections occur each year in USA, at a cost of $25,000 per infection. The Joint Commission has dedicated one of their National Patient Safety Goals to the prevention of catheterrelated bloodstream infections. (Berg, 2011) .

A prospective study was conducted on central venous catheter-related bloodstream infections: incidence, risk factors, outcome, and associated pathogens at Escorts Heart Institute and Research Centre, New Delhi. Out of 1314 patients, 35 had CVC-BSI. On multivariate analysis, the mortality rate in CVC-BSI was 22.9% as compared with 0.2% in non-CVC-BSI cases ($p < 0.001$). The mortality was increased with CVC-BSI. (Roberts 2011).

Infections associated with intravascular catheters account for 10% to 20% of all nosocomial infections.[8] Healthcare-associated infections are a significant problem and 20-40 percent of healthcare-associated bloodstream infections may be linked to a central venous catheters .This infection is referred to as central line associated bacteraemia (CLAB). (Perry 2011).

A prospective study was conducted on catheter-related v/s catheter-associated bloodstream infection in ICU in USA. During the 24 month of study period, 1000 catheters per day were sent for the culture and sensitivity, and it was found that catheter-related bloodstream infection rate is lower than the catheter associated bloodstream infection. (Cathy Wong, 2010).

A prospective cohort study was conducted on risk of catheter-related bloodstream infection with peripherally inserted central venous catheter used in hospital patients in ICU, USA. One hundred and fifteen patients were selected using simple random method. This study concluded that peripherally inserted central venous catheters used in high risk hospitalized patients are associated with a rate of CR-BSI similar to conventional central venous catheters placed in the internal jugular or subclavian vein. (Arelena 2009).

Methods and techniques used during central venous catheters management by nurses are critically important to preventing Catheter Line Associated Blood stream infections. Lack of adherence to recommended evidence-based guide-lines for preventing infections associated with use of central venous catheters may be due to nurses' lack of knowledge of the guidelines[9]. During the clinical experience, the investigator observed that staff nurses those who are working in ICU are not have enough knowledge on central venous catheter care and management. Hence the investigator felt that the need to take up a planned teaching programme on prevention of blood stream infection following central venous catheters insertion. This will be effective to improve their knowledge on central venous catheter care and reduction of infection (Perry 2012).

Statement of the problem

"A study to assess the Effectiveness of planned teaching programme on prevention of bloodstream infection following central venous catheter insertion among staff nurses working in selected hospitals at Coimbatore."

Objectives

The objectives of the present study are:

1. To assess the level of knowledge among staff nurses on prevention of bloodstream infection following central venous catheter insertion.
2. To deliver the planned teaching programme regarding prevention of bloodstream infection following central venous catheter insertion.
3. To evaluate the effectiveness of the planned teaching programme among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

4. To find the association of knowledge score with selected demographic variables.

Hypothesis

There is a significant difference between pre test and post test score among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

Operational definitions

An operational definition of a concept specifies the operations that researchers must perform to collect and measure the required information.

Assess **:** It refers to the measurement of knowledge on prevention of bloodstream infection following central venous catheter insertion.

Effectiveness**:** In this study effectiveness refers to significant gain in knowledge of staff nurses on prevention of bloodstream infection following central venous catheter insertion as determined by significant difference in pre and post-test knowledge scores

Planned teaching programme**:** In this study, planned teaching programme refers to the teaching program for staff nurses on prevention of bloodstream infection following central venous catheter insertion with the help of LCD.

Prevention**:** In this study it is refers to the aseptic technique to be followed while maintaining the central venous catheter to reduce the risk of entry of micro organism.

Bloodstream infection**:** Invasion and multiplication of micro-organisms in the blood due to central venous catheter insertion.

***Central venous catheter insertion*:** A small, flexible catheter placed in large veins like subclavian veins, femoral veins, and jugular veins with tip of the catheter should be placed in the superior vena cava, just above the right atrium

***Staff nurses*:** Those who have diploma or degree in nursing.

Assumptions

Assumptions are statements that are taken for granted, or are considered true, even though they have not been scientifically tested. They serve as the foundation upon which the research study is based.

The study assumes that:

- Bloodstream infections are common in ICU patients with central venous catheter.
- Planned teaching programme can improve the staff nurses knowledge on prevention of bloodstream infection following central venous catheter insertion.

CHAPTER-II

REVIEW OF LITERATURE

Review of literature is a key step in the research process. Review of literature refers to an extensive, exhaustive, and systematic examination of publications relevant to the research project. Nursing research may be considered as a continuing process in which knowledge gained from earlier studies is an integral part of the research in general.

A researcher analyses existing knowledge while conducting a study, when interpreting the result of the study, and when making judgments about applications of a new knowledge in nursing practice.

The investigator studied and reviewed the related literature to broaden the understanding and gain insight into the problem under study. Based on the supporting tool, for the purpose of easy understanding the review of literature is discussed under the following headings:

1.Literature related to Prevalence of central venous catheters related blood stream infections.

2.Literature related to prevention of blood stream infection due to central venous catheters.

3.Literature related to effectiveness of planned teaching programme on prevention of blood stream infection.

I. Prevalence of CVC related blood stream infections

Schuell et.al (2010) conducted a study on central venous catheter-related blood stream infection rate in critical care units in a tertiary care, teaching hospital at Mumbai, India in 2011. Data was collected by semi quantitative method. Peripheral blood cultures were collected from the patients with clinical evidence of sepsis.

Belghteal (2009) conducted a study on 85 CVCs were used in 78 patients in various critical care units who developed signs of septicaemia during catheterization period. The average CRBSI rate was 9.26 per 1000 catheter days ranging from 8.64 per 1000 catheter days in PICU to maximum rate of 27.02 per 1000 catheter days in NICU. In adult CCU, medical ICU has much lower CRBSI as compared to surgical ICU. Catheter colonization did not appear to have direct bearing on blood stream infection (*P*-value 0.59, Fisher test, not significant). The predictive value of positive tip culture for diagnosis of CRBSI was found to be very low (0.1224). Hence antibiotic treatment based on the positive tip culture does not appear to be justified. No relation was observed with the duration of catheterization and CRBSI.

Karen.et.al(2010) conducted a study on non randomized study was conducted on peripherally inserted catheters may lower the incidence of catheter-related bloodstream infections in patients in surgical intensive care unit in the Southern Medical Centre at Texas in 2010. Non-randomized sampling technique is used for data collection with sample size 121 patients. Multivariable regression was performed to identify predictors of CR-BSI. Results were 13 CVC infections and one PICC infection, resulting in an infection rate of 6.0/1,000 catheter-days for central venous catheters and 2.2/1,000 for PICCs. The infected PICC was in place for 19 days, whereas the remainder of the PICCs were in place a mean of 14-17 days. Logistic regression demonstrated that line days was the only independent predictor of central venous catheters infection (p=0.015) These results suggest that minimizing the duration of central venous access and substituting PICC for central venous catheters may reduce the incidence of CR-BSI in long-stay SICU patients.

Johor Bahru (2010). conducted a study on Out of the 655 central venous catheters in 496 patients in the intensive care unit catheter-related-bloodstream infection was diagnosed in 38 catheters. The majority of the central venous catheters were inserted via the subclavian or the internal jugular routes and there was no statistical difference in CR-BSI between them (p = 0.83). In this study they found that the top two organisms were Klebseilla pneumonia and Pseudomonas aeruginosa. In conclusion, the incidence of CR-BSI in ICU was 9.43 CR-BSI per 1000 catheter days. The risk factors were duration of CVC in situ, venue of insertion and use of 4 lumen catheter for total parenteral nutrition. The site of insertion, number of lumen up to 3 lumens and the number of attempts were not risk factors.

Willy (2011) conducted a study on the incidence of infectious complications of central venous catheters at the subclavian, internal jugular, and femoral sites in an intensive care unit population at India in 2009. Data was collected from all patients were triaged into the intensive care units. Two groups of patients were analyzed. Group 1 was patients with one catheter at one site, and group 2 was patients with catheters at multiple sites. The incidence of catheter infection (4.01/1,000 catheter days, 2.29% catheters) and colonization (5.07/1,000 catheter days, 2.89% catheters) was low overall. In group 1, there was no statistically significant difference in the incidence of infection and colonization or duration of catheters (p = .8907) among the insertion sites. In group 2, there was also no statistically significant difference in the incidence of infection and colonization among the three insertion sites. This study concluded that in an intensive care unit population, the incidence of central venous catheter infection and colonization is low overall if the procedure is in a proper way.

Clinical journal of nursing (2014) conducted a study on randomized controlled study was conducted on influence of triple-lumen central venous catheters coated with Chlorhexidine and silver sulfadiazine on the incidence of catheter-related bacteremia in Surgical ICU at USA in 1998. All patients who needed central venous catheterization were randomized to receive either an uncoated triple-lumen catheter (n = 157) or a catheter coated with Chlorhexidine and Silver Sulfadiazine (n = 151).Data were analyzed by survival and logistic multivariate regression methods. Catheters coated with Chlorhexidine and Silver Sulfadiazine were effective in reducing the rate of significant bacterial growth on either the tip or intradermal segment (40%) compared with control catheters (52%; P = .04). This study concluded that the use of Chlorhexidine and Silver Sulfadiazine reduces the incidence of significant bacterial growth on either the tip or intradermal segments of coated triple-lumen catheters but has no effect on the incidence of catheter-related bacteremia.

II. Literature related to prevention of blood stream infection due to central venous catheters

Locombe, et.al (2012) conducted a study on case control study was conducted on intravascular catheter-related infections in an Indian tertiary care hospital at Kasturba Medical College, India in Data was collected over 19 months involving 232 patients at a tertiary care hospital. Non-tunnelled central venous catheters and midline catheters were the two types studied. Catheter tips were processed and blood cultures were drawn under strict aseptic precautions. The result shows that incidence of catheter-related blood-stream infections (CRBSI) in institute was 8.75 per 1,000 catheter days. The commonest organisms causing local infections were coagulase-negative Staphylococci, and those causing CRBSI were Staphylococcus aureus. Multidrug-resistant organisms accounted for 30.2% of the infections. This

study concluded that choice of venous cannulation to minimize the risk of catheter-related infection.

Sharma (2010) conducted a study on case study was conducted on catheter associated bloodstream infection caused by R. radiobacter in coronary care unit of a tertiary care hospital at Jaipur, India in 2010. Data was collected from a 51year old male admitted in the coronary care unit. A central venous catheter was inserted in the internal jugular vein, the patient developed fever after 48 hours of central venous catheters insertion. Blood was then collected into commercial BACTEC vials for automated culture on the BACTEC 9050 system. During the processing of samples in the microbiology lab, the blood from the central line blood positive for Rhizobium radiobacte. This study concluded that the need for including R. radiobacter in the list of pathogens causing bacteraemia in immune competent patients, especially in the presence of an intravenous catheter.

Hollins (2010) conducted a study on retrospective study was conducted on an analysis of long-term venous access catheters in cancer patients: experience from a tertiary care centre in India at All India Institute of Medical Sciences, New Delhi in 2002. Data was collected from a total of 110 patients with various malignancies requiring long-term venous access. A record of all complications and catheter loss and final outcome were analysed. A total of 111 catheters were used in 110 patients. Duration of catheter indwelling period ranged from 7 to 365 days with a median of 120 days. In 90% of the cases the catheter tip was located either in superior vena cava or in right atrium. Total catheter related complications were observed in 37 (34.54%) patients and catheter loss rate due to complications was 15.4% (17/111). This study concluded that long-term venous access using Hickman catheter insertion by open cut

down method is a simple, safe and reliable method for administration of chemotherapeutic agents, antibiotics and blood products. The incidence of various complications and catheter loss was acceptable and overall patient satisfaction was good.

Crossland et.al., (2009) conducted a study on An experimental study was conducted on a new central venous catheter cap: decreased microbial growth and risk for catheter-related bloodstream infection at Chicago in 2009. The AB Cap device is a catheter cleaning device designed to keep needleless luer valves clean by encapsulating them in a cleaning solution. This device was evaluated using an in vitro model of hub contamination. Following hub contamination on days 1, 3, 5 and 7, saline was infused through the AB Cap and effluent collected from the efferent end. Growth of three organisms was detected in two of the three test AB Caps following contamination day 3, after 1-4 days of incubation. One test item remained free of growth for the entire test period except for one organism. By day 7, this particular test item grew an additional organism and the testing was concluded. This study concluded that an antimicrobial catheter cap is not a complete substitute for a proper catheter cleaning technique and other anti-infection precautions. However, they describe a unique catheter cap that significantly decreased the likelihood of a catheter-related infection from a non-cleaned cap in an in vitro model.

(William and Long, 2009). conducted a study on observational study was conducted on prevention of central venous catheter-associated bloodstream infections in paediatric intensive care units: a performance improvement collaborative in children's hospitals at USA in 2009. Data was collected from 26 freestanding children's hospitals. CVC-associated BSI protocols were implemented using a collaborative process that included catheter insertion and maintenance

bundles, daily review of central venous catheters necessity, and daily goals. The collaborative median central venous catheters -associated Blood Stream Infection rate decreased from 6.3 central venous catheters -associated BSIs per 1,000 central venous catheters -days. Sixty-five percent of all participants documented a decrease in their central venous catheters -associated Blood Stream Infection rate. Hospitals were able to sustain their improvements during a 12-month sustain period and prevent another 198 infections. This study concluded that our collaborative quality improvement project demonstrated that significant reduction in central venous catheters -associated Blood Stream Infection rates and related costs can be realized by means of evidence-based prevention interventions, enhanced communication among caregivers, standardization of CVC insertion and maintenance processes, enhanced measurement, and empowerment of team members to enforce adherence to best practices.

(Nova Cancer Society, 2010). conducted a study on prospective, observational study was conducted on risk factors and prognosis of catheter-related bloodstream infection in critically ill patients: a multicentre study in ICU at Mumbai in 2009. Data was collected from 1,366 patients and 2,101 catheters were analyzed. The incidence of CR-BSI was significantly higher in central venous catheters compared with peripherally inserted central venous catheters (PICVC) without significant differences among the three locations of central venous catheters. In the multivariate analysis, duration of catheterization and change over a guide wire were the independent variables associated with the development of CR-BSI whereas the use of a PICVC was a protective factor. Excluding PICVC, 1,598 conventional central venous catheters were analyzed. This study concluded that peripherally inserted central venous catheters are associated with a lower incidence of CR-BSI in critically ill patients.

Julie Suhr (2010) conducted a study on retrospective study was conducted on reduction of central venous catheter associated blood stream infections following implementation of a resident oversight and credentialing policy in Penn State Milton S. Hershey Medical Centre at Pennsylvania in 2011. Data was collected prospectively in all patients undergoing non-tunnelled central venous catheters placement at adult ICUs and a paediatric ICU on CLABSI, line days, and serious adverse events in the year prior to and following policy implementation. A total of 813 supervised central lines were self-reported by residents in four departments. Statistical analysis was performed using paired Wilcoxon signed rank tests. There were reductions in median CLABSI rate (3.52 vs. 2.26; p = 0.015), number of CLBSI per month (16.0 to 10.0; p = 0.012), and line days (4495 vs. 4193; p = 0.019). This study concluded that Implementation of a new CVC resident oversight and credentialing policy has been significantly associated with an institution-wide reduction in the rate of CLABSI per 1,000 central line days and total central line days.

Asian Pacific journal of cancer prevention (2015) conducted a study on prospective cohort with a nested case-control study was conducted on central venous catheter-associated bloodstream infections occurring in Canadian intensive care units: A six-month cohort study in ICUs at Canada in 2006. Data were collected using a standardized format on all central venous catheters . Mean rates of central venous catheters -associated BSIs per 1000 central venous catheters days were 6.9, 6.8 and 5.0 in adult, neonatal and paediatric ICUs, respectively. In the case-control study, 80% of the variance in a backward elimination logistic regression analysis was explained by duration of central venous catheters insertion, receiving chemotherapy, more than one central venous catheters insertion during the study, insertion of a central venous catheters with two or more lumens, using the central venous catheters to

administer total parenteral nutrition and having a surgical wound other than a clean wound. This study concluded that risk factors explaining 80% of the variance associated with BSIs and is one of the largest reports on the rate of central venous catheters -associated BSIs occurring in the ICU setting.

Hazwani (2011) conducted a study on intervention study was conducted to decrease catheter-related bloodstream infections in ICU at Michigan in 2006. An evidence-based intervention was used to reduce the incidence of catheter-related bloodstream infections. A total of 108 ICUs participated in the study and included two-level random effects to account for nested clustering within the data, catheter-related bloodstream infections within hospitals, and hospitals within the geographic regions included in the study. A sensitivity analysis used and reported P values were two-sided: a P value of 0.05 or less was considered to indicate statistical significant. The study concluded that a large-scale project focused on reducing the incidence of catheter-related bloodstream infection was feasible and can have important public health consequences.

Sheu et.al (2007) conducted a study on observational study conducted on central venous catheter-related infection in a prospective and observational study of 2,595 catheters in medical ICU at Spain in 2005. Data was collected from 2,018 patients admitted to the ICU. The number of central venous catheters and days of catheterization duration were: global, 2,595 and 18,999. Catheter Related Local Infection incidence density was statistically higher for femoral than for jugular ($p < 0.001$) and subclavian ($p < 0.001$) accesses, and higher for jugular than for subclavian access ($p < 0.001$). Catheter Related Blood Stream Infection incidence density was statistically higher for femoral than for jugular ($p = 0.002$) and subclavian ($p < 0.001$)

accesses, and higher for jugular than for subclavian access (p = 0.005).This study results suggest that to minimize the central venous catheters -related infection risk, should be subclavian, jugular and femoral vein.

The oncology nursing association (2010) conducted a study on randomized study was conducted on Clinical review: New technologies for prevention of intravascular catheter-related infections at Italy in 2009. In two randomized clinical trials conducted in surgical patients assigned to receive a CVC with or without a silver cuff, the incidence of CRBSI was significantly greater in the control than in the cuffed catheter group (3.7% versus 1%). In the third clinical trial, however, no difference in the rates of catheter colonization. In the largest clinical trial, which included 538 patients randomly assigned to receive a C-SS impregnated catheter or a non impregnated catheter, in which the mean duration of catheterization was 20 ± 12 days, no significant difference in the incidence of CRBSI was observed between the control group (4.7%) and the C-SS catheter group (5%). In a prospective clinical trial in which patients were randomly assigned to receive either minocycline-rifampin or C-SS catheters, the rate of CRBSI was significantly lower in the former group than in latter group (0.3% versus 3.4%).This study concluded that most central venous catheters -related infections are preventable and new technologies that have already been proven to be effective in clinical trials in preventing central venous catheters infections, particularly those intended for short-term use, should be considered in clinical practice.

Zhang et.al (2012) conducted a study on experimental study was conducted on antibiotic-Heparin Lock: In Vitro Antibiotic Stability Combined with Heparin in a Central Venous Catheter at Canada in 2010. As an initial step in developing an antibiotic-heparin lock, they investigated the in vitro stability of antibiotic-heparin combinations in

central venous catheters. Antibiotics were incubated separately in glass test tubes in the dark at 37ºC for 72 hours. Samples were analyzed spectrophotometrically for stability at 24-hour intervals. The procedure was repeated with the addition of heparin (final concentration 5000 U/ml in glass test tubes), and the combination was also examined in central venous catheters. High-performance liquid chromatography analysis was conducted on the antibiotic-heparin combinations at 72 hours to confirm the spectrophotometric results. Absorbance values decreased for all antibiotics, with the greatest decreases at 72 hours for cefazolin (27.4%), vancomycin (29.7%), ceftazidime (40.2%), and gentamicin (8%) when combined with heparin. Although free antibiotic in central venous catheters solution was reduced, the concentration should be sufficient to decrease the frequency of infections associated with central venous catheters. This study concluded that the concentrations of vancomycin, ceftazidime, cefazolin, or gentamicin used should be sufficient for an antibiotic-heparin lock.

The study of Hayama and Inoue (2012) conducted a study on observational study was conducted on vital Signs: Central Line-Associated Blood Stream Infections — United States, 2001, 2008, and 2009. Central-line utilization and CLABSI rates were obtained from the National Nosocomial Infections Surveillance System for 2001 estimates (ICUs only) and from the National Healthcare Safety Network (NHSN) for 2009 estimates (ICUs and inpatient wards). In 2001, an estimated 43,000 CLABSIs occurred among patients hospitalized in ICUs in the United States. In 2009, the estimated number of ICU CLABSIs had decreased to 18,000. In 2009, an estimated 23,000 CLABSIs occurred among patients in inpatient, wards and, in 2008, an estimated 37,000 CLABSIs occurred among patients receiving outpatient haemodialysis.

Demiralp, m., oflaz et.al (2010) conducted a study on semi quantitative study was conducted on central venous catheter-related infections in a tertiary care hospital at Madras Medical Mission, Chennai in 1998. Sample was collected from the age group from 2 months to 66 years. A total of 119 catheter tips were sent for the culture and 9.24% showed significant growth with associated bloodstream infection; 11.76% of the CVCs showed scanty or less than 15 colonies in roll or contents and there was no associated bloodstream infection; 5.88% showed moderate to heavy growth in roll and contents and there was no bloodstreaminfection. The results of the study indicated that gram negative organisms formed the predominant isolates. Considering the fact that 1553 operations were performed during the study period, the infection rate through central venous catheters would work out to a negligible 0.71%..

Sanaat (2012) conducted a study on prospective study was conducted on catheter-related bacteraemia and outcome of attempted catheter salvage in patients undergoing haemodialysis in University hospital. A total of 102 patients with end-stage renal disease who underwent haemodialysis with dual-lumen cuffed catheters were participated in the study. Microbiological cultures were done to identify catheter-related bacteraemia. 102 patients had a total of 16 081 catheter-days. 40% of patients developed 62 episodes of bacteraemia. 39% of catheters were removed immediately, and 61 % were left in place during treatment. Only 32% of the 38 catheters were salvaged successfully. Salvage was less likely to succeed in patients with gram-positive bacteraemia than in patients with gram-negative bacteraemia, but this difference was not statistically significant *(P* = 0.14). Nine of the 41 patients (22%) who developed bacteraemia had the following complications: osteomyelitis (6 patients), septic arthritis (1 patient), infective endocarditis (4 patients), and death (2 patients).The study concluded that all complications followed an episode of gram-positive bacteraemia, and none was associated with attempted catheter salvage.

Fadiloglu (2008) conducted a study on prospective open study was conducted on complications of central venous access systems: a study of 218 patients. Data collected from 218 consecutive patients who required long term venous access either for chemotherapy or for total parenteral nutrition, and who had no evidence of infection, a platelet count of over 40 x 10(9)/l, or a life expectancy of three months or more, had 234 devices inserted. Between February 1985 and December 1990, 234 devices were implanted in 218 patients aged from 0.9 to 78 years. The median (range) length of time that the catheters functioned was 277 (7-1887) days. The overall incidence of complications was 0.09/100 days inserted, and the complication rates for infection and thrombosis were 0.02 and 0.03/100 days, respectively. Thirty two devices were removed because of complications and 19 because the treatment had finished. Five of the 218 patients (2%) were lost to follow up. This study concluded that devices have a long working life, and a low rate of complications, and are of great value to patients who require long term or cyclical intravenous treatment

Cheng et al. (2013) conducted a study on randomized controlled study was conducted on prevention of central venous catheter-related bloodstream Infection by use of an antiseptic-impregnated catheter . One hundred and fifty eight adults were selected using randomized controlled clinical trial. 403 catheters were studied and shows antiseptic catheters were less likely to be colonized at removal than control catheters P = 0.005 and were nearly fivefold less likely to produce bloodstream infection P = 0.03. In the control group, 8 catheter-related bloodstream infections were caused by Staphylococcus aureus, gram-negative bacilli, enterococci, or Candida species; no infections with these organisms occurred in the antiseptic catheter group (P = 0.003). No adverse effects from the antiseptic catheter were seen, and none of the 122 isolates obtained from infected catheters in either group showed in vitro resistance to

chlorhexidinesilver sulfadiazine. This study concluded that chlorhexidine-silver sulfadiazine catheter is well tolerated, reduces the incidence of catheter-related infection, extends the time that noncuffed central venous catheters can be safely left in place for the short term, and should allow cost savings

Nilhan Sezgin and Bahar Ozcan (2009) conducted a study on randomized controlled study was conducted on prevention of central venous catheter-related bloodstream infection by use of an antiseptic-impregnated catheter. A randomized, controlled trial in medical surgical ICU. Samples selected from 450-bed university hospital by using randomized, controlled clinical trial. Data collected from 158 adults scheduled to receive a central venous catheter. Antiseptic catheters were less likely to be colonized at removal than control catheters (13.5 compared with 24.1 colonized catheters per 100 catheters; relative risk, 0.56 [95% CI, 0.36 to 0.89]; P = 0.005) and were nearly fivefold less likely to produce bloodstream infection (1.0 compared with 4.7 infections per 100 catheters; 1.6 compared with 7.6 infections per 1000 catheter-days; relative risk, 0.21 [CI, 0.03 to 0.95]; P = 0.03). Cost-benefit analysis indicated that the antiseptic catheter should prove cost-beneficial if an institution's rate of catheter-related bacteremia with noncuffed central venous catheters is at least 3 infections per 1000 catheter-days.This study concluded that chlorhexidine-silver sulfadiazine catheter is well tolerated, reduces the incidence of catheter-related infection, extends the time that noncuffed central venous catheters can be safely left in place for the short term, and should allow cost savings.

Song et al. (2013) conducted a study on evidence based study was conducted on critical care nurses' knowledge of evidence-based guidelines for preventing infections associated with central venous catheters: An evaluation questionnaire at Ghent,

Belgium in 2010. Of the 855 registered participants, 89.1% response rate. The responses were collected anonymously. A total of 10 nursing-related strategies were identified from current evidence-based guidelines for preventing infections associated with use of central venous catheters. Face and content validation were determined for selected interventions and multiple-choice questions. The test results of 762 critical care nurses were evaluated for item difficulty, item discrimination, and quality of the response alternatives or options for answers. Values for item difficulty ranged from 0.1 to 0.9. Values for item discrimination ranged from 0.05 to 0.41. The quality of the response alternatives indicated widespread misconceptions among the critical care nurses in the sample. This study concluded that questionnaire is used can lead to better educational programs for critical care nurses on infections associated with use of central venous catheters.

III. **Literature related to effectiveness of planned teaching programme on prevention of blood stream infection.**

Thomas G.B (2012) conducted a study on interventional study was conducted on the effect of an education program on the incidence of central venous catheter-associated bloodstream infection in a Medical ICU at Barnes-Jewish Hospital in 2013. Data was collected from all patients admitted to the ICU were prospectively followed up by members of the hospital infection control team and surveyed for the occurrence of central venous catheter-associated bloodstream infection. A mandatory education program directed toward ICU nurses and physicians. The program consisted of a 10-page self-study module on risk factors and practice modifications involved in catheter-related bloodstream infections. Wilcoxon rank-sum test was performed, $p < 0.05$ was considered significant on two-tailed testing. Seventy-four episodes of catheter-associated bloodstream infection occurred in 7,879 catheter-days in the 24

months before the introduction of the education program. Following implementation of the intervention, the rate of catheter-associated bloodstream infection decreased to 41 episodes in 7,455 catheter days [p = 0.019]. This study concluded that an intervention focused on the education of health-care providers on the prevention of catheter-associated bloodstream infections may lead to a dramatic decrease in the incidence of primary bloodstream infections.

Mishra. et al (2012) conducted a study on pre- and post-intervention observational study was conducted on Effect of an education program on decreasing catheter-related bloodstream infections in the surgical intensive care unit. A program primarily directed toward registered nurses was developed by a multidisciplinary task force to highlight correct practice for central venous catheter insertion and maintenance. The program consisted of a 10-page self-study module on risk factors and practicemodifications involved in catheter-related infections as well as a verbal in-service at staff meetings. Each participant was required to take a pre- test before taking the study module and an identical test after its completion. Fact sheets and posters reinforcing the information in the study module were also posted throughout the ICU. The result shows that seventy-four primary bloodstream infections occurred in 6874 catheter days in the 18 months before the intervention. After the implementation of the education module, the number of primary bloodstream infections fell to 26 in 7044 catheter days, a decrease of 66% ($p < .0001$). This study concluded that a focused intervention primarily directed at the ICU nursing staff can lead to a dramatic decrease in the incidence of primary bloodstream infections.

Conceptual framework

Conceptual framework is a set of coherent ideas or concepts organised in a manner that makes them easy to communicate to others. A framework can help us to explain why we are doing a project in a particular way. It can also help us to understand and use the ideas of others who have done similar works in the past. We can use a framework like a travel map, because others before us have come up with common symbols to mark streets, lakes, highways, etc. A framework can help us decide and explain the route we are looking.

Conceptual framework is structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking for. Framework frames their questions and finds suitable literature. It is the tool the researcher uses to guide their enquiry. It will guide the researcher in his data collection. It enables the researcher to find the links between existing literature and his own research goals.

The conceptual framework of the present study developed by the investigator based on the Context Input Process Product model of Daniel Stufflebeam (1983).

The CIPP (Context ,Input, Process, Product) model is a simple system model applied to programme evaluation. CIPP stands for context evaluation, input evaluation, process evaluation and product evaluation. The present study aims to evaluate the effectiveness of planned teaching programme to improve the knowledge of staff nurses on prevention of blood stream infection following central venous catheters insertion.

Context

Context evaluation includes examining and describing the context of the programme we are evaluating, conducting needs and goals assessment, determining the objectives of the programme, and determining whether the proposed objectives will be sufficiently responsive to the identified needs. It helps in making programme planning decisions.

In the present study, context evaluation includes the demographic variables like age, sex, professional qualification, years of experience, department of working, in-service education on infection control, previous information on prevention of blood stream infection related to central venous catheters and setting of the selected hospital.

Input

Input evaluation examines what the programme plans on doing. It helps in making programme structuring decisions.

In the present study, input includes existing knowledge on prevention of blood stream infection related to central venous catheters and PTP on prevention of blood stream infection following central venous catheters insertion.

Process

Process evaluation includes examining how a programme is being implemented and monitoring how the programme is performing. Process evaluation helps in making implementation decisions[19].

In the present study, process includes assessing the existing knowledge on prevention of blood stream infection following central venous catheters

insertion (pre-test), administration of PTP on prevention of blood stream infection following central venous catheters insertion, post evaluation of knowledge (post-test) by the investigator, and responding to structured knowledge questionnaire and participating in PTP by the staff nurses.

Product

Product evaluation includes determining and examining the general and specific outcome of the programme.

In the present study the product may be either gain in knowledge or no gain in knowledge.

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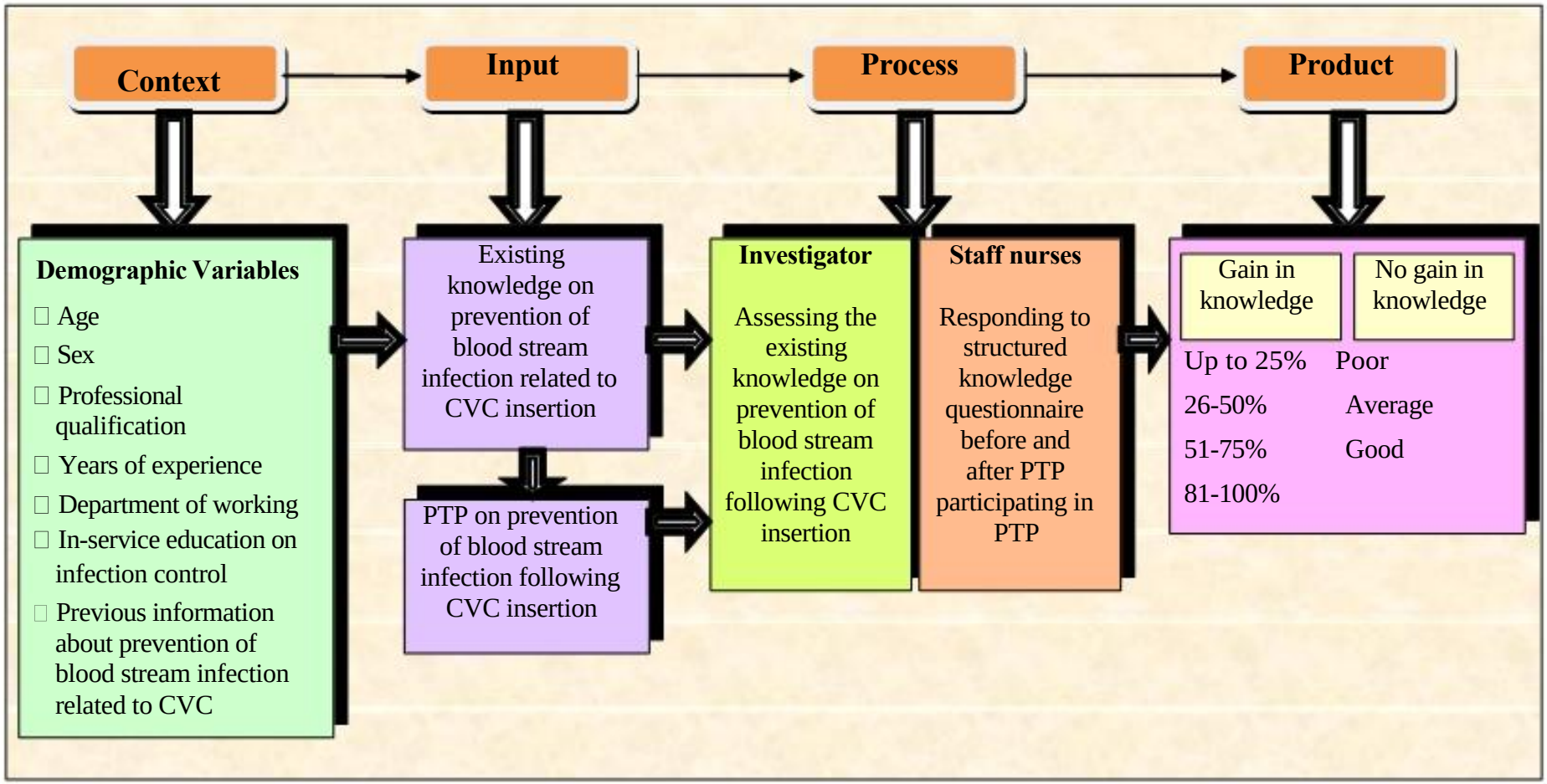

Fig. 1 Conceptual frame work of CIPP modified and developed from Daniel Stufflebeam (1983)

CHAPTER-III

METHODOLOGY

Research methodology is a way to solve the research problem systematically. It deals with defining the problem, formulation of hypothesis, methods adopted for data collection and statistical techniques used for analysing the data with logical reason behind it.

In this chapter, the details of the methodology that is adopted by the investigator to assess the effectiveness of planned teaching programme on prevention of blood stream infection following central venous catheter insertion among staff nurses working in selected hospitals at Coimbatore is explained.

Research approach

Evaluative approach a sub type of quantitative approach was used for the present study.

Research design

A researcher design selected for the study is one group pre-test ,post-test design.

It is type of pre experimental research design .

O_1 X O_2

O_1 -Pre- test assessment

X - Planned teaching programme

O_2 - Post-test assessment

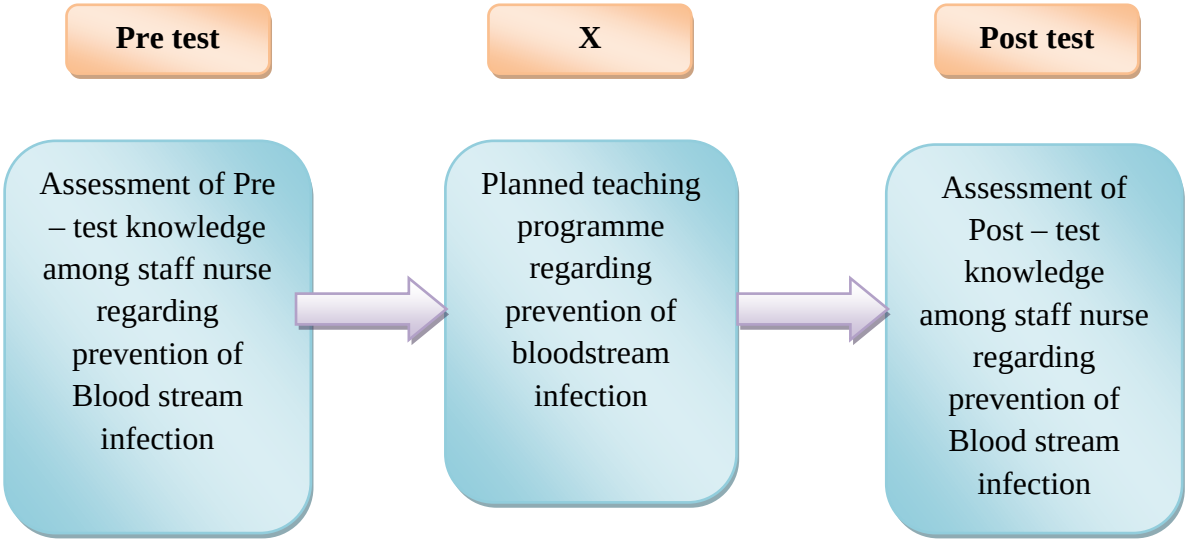

Fig. 2 Schematic Representation of Research Design

Setting of the study

The setting is where the population or the portion of that is being studied, is located and where study is carried out. This study is conducted in Ashwin hospitals at Coimbatore.

Variables

Variables are qualities, properties, or characteristics of person, thing, or situation that change or vary in a study. Variables are also concepts at different levels of abstractions that are concisely defined to promote their measurement or manipulation within a study.

The independent variable was planned teaching programme regarding prevention of blood stream infection following central venous catheter insertion. The dependent variable was knowledge of staff nurses regarding prevention of blood stream infection following central venous catheter insertion. The influencing variables were demographic variable such as age, sex, professional qualification, year of experience, department of working, in service

education of infection control, previous information about prevention of blood stream infection related to central venous catheter

Population

The term population refers to the aggregate or totality of all the objects, subjects or members that confirm to a set of specifications. In the present study the population comprises of staff nurses working in ICU.

Sample size

Sample is the subset of population selected to participate in a research study. Sample size is the number of items to be selected from the universe to constitute a sample. The sample size consisted of 50 staff nurses working in ICU in selected hospitals at Coimbatore.

Sampling technique

Sampling is the process of selecting a group of people, events, behaviours or other elements with which a researcher can conduct a research study.

In the present study 50 sample are chosen by using purposive sampling techniques.

Criteria for selection of samples

Inclusive criteria

Inclusion criteria are the sampling requirements identified by the researcher that must be present for the element or subject to be included in the sample.

In this study, the inclusion criteria were:

1. Male and female staff nurses working in ICUs of the selected Hospitals.
2. Those who have diploma or degree in nursing.

Exclusive criteria

Exclusion criteria are the sampling requirements identified by the researcher that eliminate or exclude an element or subject from being in the sample.

In this study, the exclusion criteria were:

- ✓ Staff nurses who are not willing to participate.

Description of the tool

The tool is developed after extensive review of literature of relevant topics and discussions with the experts and based on experience of the investigator. The following steps are undertaken to prepare the final tool.

In this study, the level of knowledge on prevention of blood stream infection following central venous catheters insertion is the dependent variable.

Section A: Demographic proforma

The Demographic proforma consists of 7 items: age, sex, professional Qualification, years of experience, department of working, in-service education on infection control and previous information about prevention of blood stream infection related to The final tool consisted of knowledge questionnaire.

Section B: Structured knowledge questionnaire

This consist of thirty multiple choice question to assess the knowledge level of staff nurses on prevention of blood stream infection following central venous catheter insertion. The question are of multiple choice which carry 1 mark for each correct answer.

Testing of the Tool

Content validity

Content validity is based on the extent to which a measurement reflects the specific intended domain of content.

In order to obtain content validity of data collection tool, the prepared instrument along with problem statement, objectives, operational definitions, were submitted to 5 experts and Medical and Surgical Nursing.

Reliability

Split half technique is used to find out the reliability. Co-relation is computed with Karl Pearson correlation coefficient formula. It is found to be 0.78, which indicated that the tool is reliable.

Pilot study

A pilot study was conducted to find out the feasibility and practicability of the study. Pilot study was conducted at Ashwin Hospital, Coimbatore. Data collection period was for 10 days. Purposive samplings of 10 subjects were selected for the study.After the pre-test PTP is administered on the same day on the 8^{th} day post-test was conducted using the same tool to assess the effectiveness of PTP. Hence the study is feasible,practicable and acceptable.

Data Collection Procedure

A formal written permission for the main study was obtained by the investigator from the concerned authorities before the data collection. Data collection period extended from 01-11-2015 to 30-11-2015

The investigator selected the sample that met the inclusion criteria purposively and met the staff nurses and assured the confidentiality of their responses and informed consent was obtained from the staff nurses. The structured knowledge questionnaire was administered to assess the knowledge of staff nurses prevention of blood stream infection following CVC insertion. The average time taken for pre-test was 25 minutes.

On the same day planned teaching programme was conducted by using the LCD A post-test was conducted on the 8th day using the same tool. The staff nurses were thanked for their participation and cooperation.

Plan for data analysis

Data analysis is a systematic organization and synthesis of the research data and testing of research hypothesis using data. The data analysis was done by using descriptive statistics and inferential statistics.

Descriptive statistics

The demographic variable were analyzed by using frequency and percentage

Inferential statistics

The effectiveness of knowledge level of staff nurses regarding prevention of blood stream infection following central venous catheter insertion were analyzed by using paired "t" test and χ^2 test respectively.

CHAPTER-IV

DATA ANALYSIS AND INTERPRETATION

Analysis is the process of organising and synthesizing data in such a way that research questions can be answered and hypothesis tested. Interpreting the findings is the most challenging and structured step in the research findings. This requires the investigator to be creative.

The data collected from 50staff nurses working in ICU are analyzed based on the objectives of the study using descriptive and inferential statistics and discussed in this chapter.

The finding based on the descriptive and inferential statistical analysis are presented under the following headings

Section 1: Distribution of demographic variable among ICU staff

Section 2: Frequency and percentage distribution of pre test and post test score on knowledge of staff nurses on prevention of blood stream infection Following CVC insertion

Section 3 : Distribution of statistical value of pre test and post test knowledge regarding prevention of blood stream infection Following CVC insertion

Section 4 : Association of demographic variables with post test score of knowledge regarding prevention of blood stream infection Following CVC insertion

SECTION – I

DEMOGRAPHIC CHARACTERISTICS

Table 1: This section describes the demographic characteristics in terms of frequency and percentage

Sl.no	Variable	frequency	percentage
1	**Age (in years)**		
	a. 21-25	43	86.0
	b. 26-30	7	14.0
	c. 31-35	0	0.0
	d. Above 35	0	0.0
2	**Gender**		
	a. Male	10	20.0
	b. Female	40	80.0
3	**Professional qualification**		
	a. GNM	4	8.0
	b. B. Sc.	40	80.0
	c. P. C. B. Sc.	6	12.0
4	**Years of experience**		
	a. Below 1 years	39	78.0
	b. 1-3 years	7	14.0
	c. 4-6 years	4	8.0
	d. Above 7 years	0	0.0
5	**Department working**		
	a. Medical ICU	27	54.0
	b. Surgical ICU	8	16.0
	c. ICCU	4	8.0
	d. CT ICU	6	12.0
	e. Other	5	10.0
6	**Frequency percentage Attended in-service education on infection control**		
	a. Yes	3	6
	b. No	47	94
7	**Source of information on bloodstream infection related to central venous catheter**		
	a. Books	28	56
	b. Mass media	4	8
	c. Journals	6	12
	d. Health personnel	7	14
	e. Others	5	10

The Table 2 Reveals the Distribution of Demographic Variables of ICU Staff Nurses

- Majority of subjects (86%) are in the age group of 21-25. Only 14% are in the age group of 26-30.
- Majority of the staff nurses (80%) are female. Only 20% are male.
- Among the respondents most of the staff nurses (80%) are BSc Nurses, 12% are PC BSc Nurses and only (8%) are GNM.
- Among the respondents most of the staff nurses have year of experience <1 year (78%), 1-3 years (14%), and 4-6 years (8%).
- Among the respondents the staff nurses are working in Med. ICU (54%), Sur. ICU (16%), CT. ICU (12%), ICCU (8%) and other areas (10%).
- Most of the staff nurses (94%) were not attended in-service education on infection control whereas 6% were attended in-service education on infection control
- Most of the staff nurses (56%) have got information on blood stream infection related to central venous catheter from books, 14% from health personnel, 12% from journals, 10% from other sources and 8% from mass Medias.

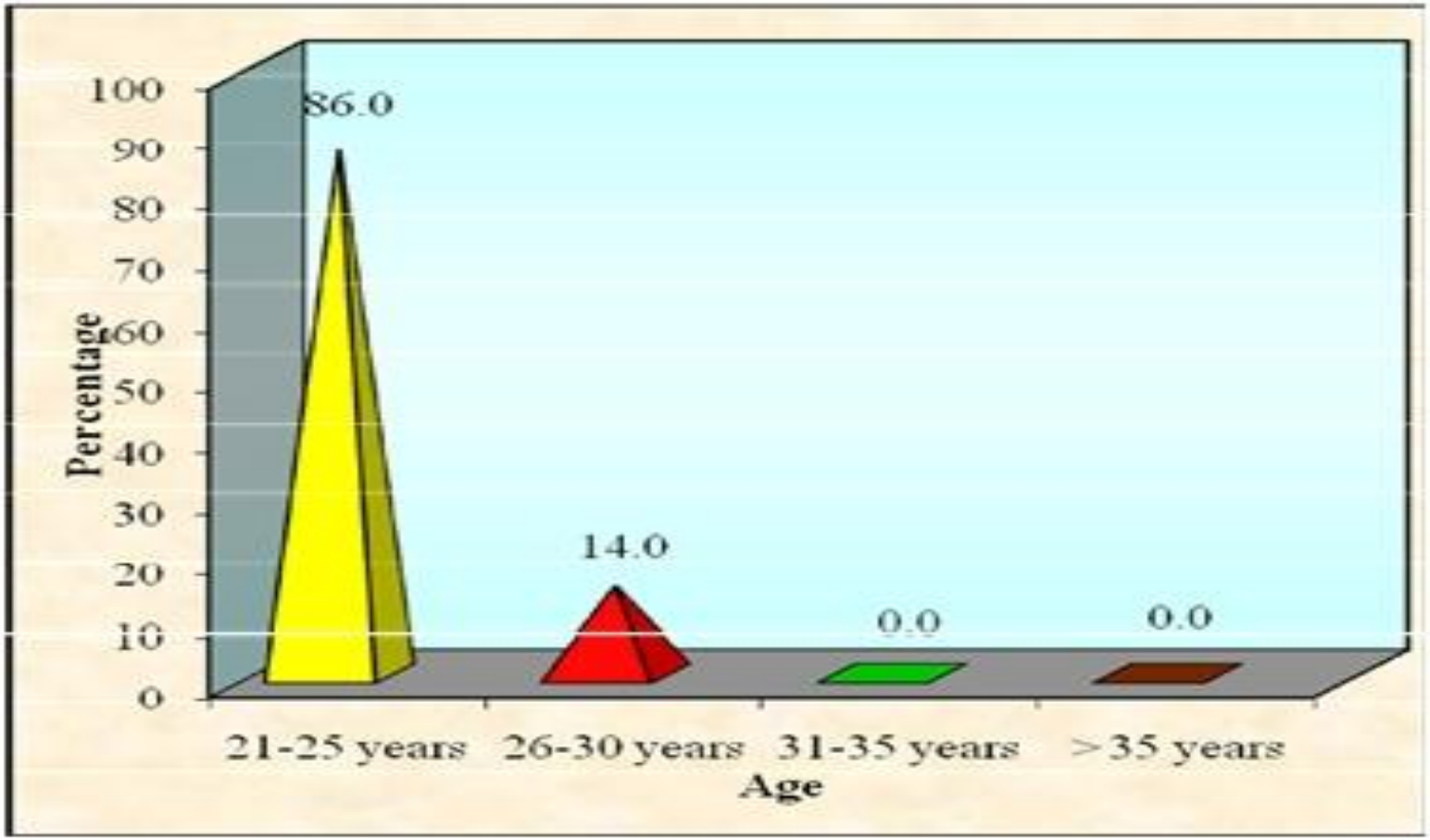

Fig. 3 Distribution of Demographic Variable according to

Age in years of ICU Staff Nurses

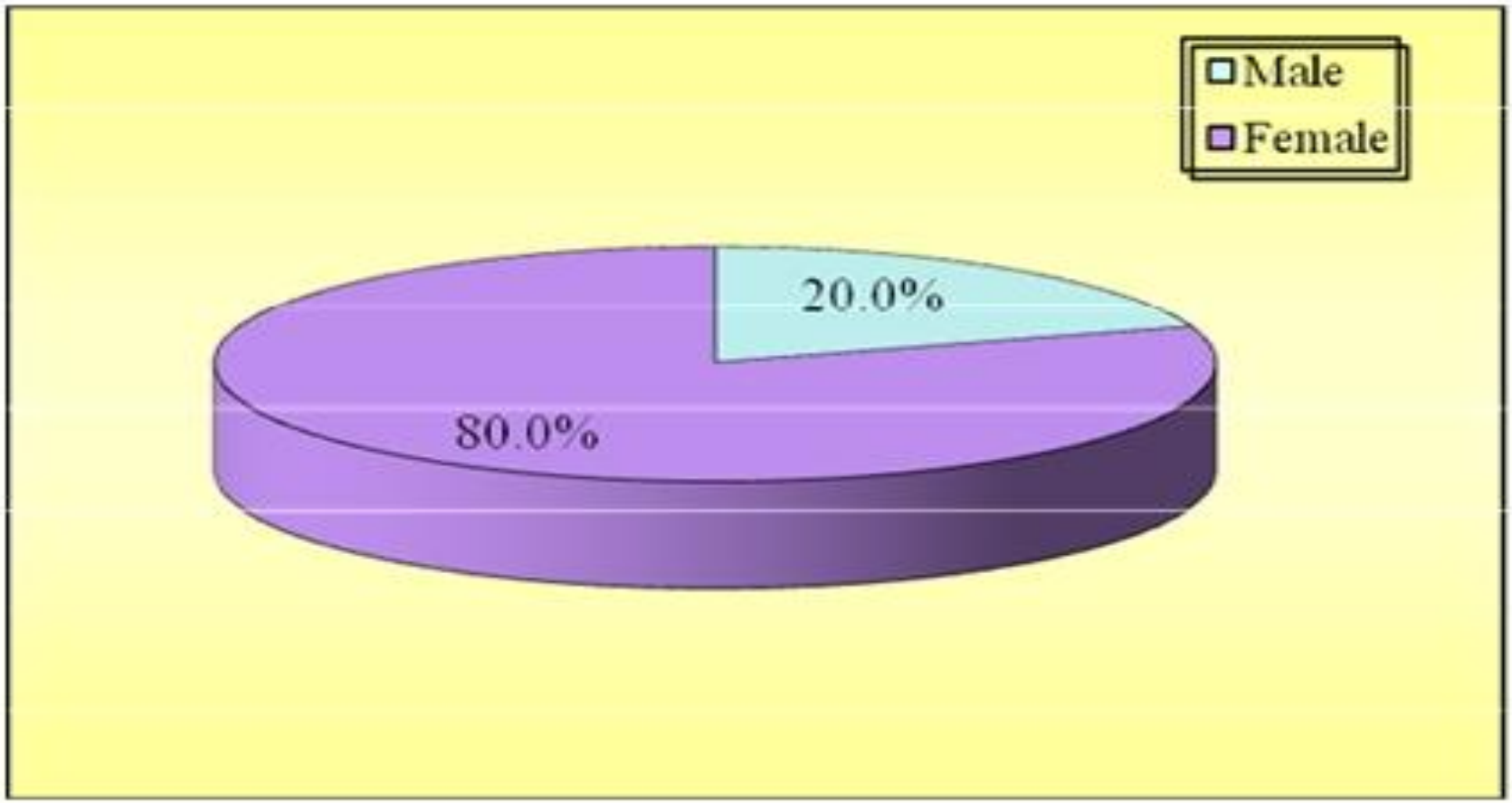

Fig. 4 Distribution of Demographic Variable according to Sex of ICU Staff Nurses

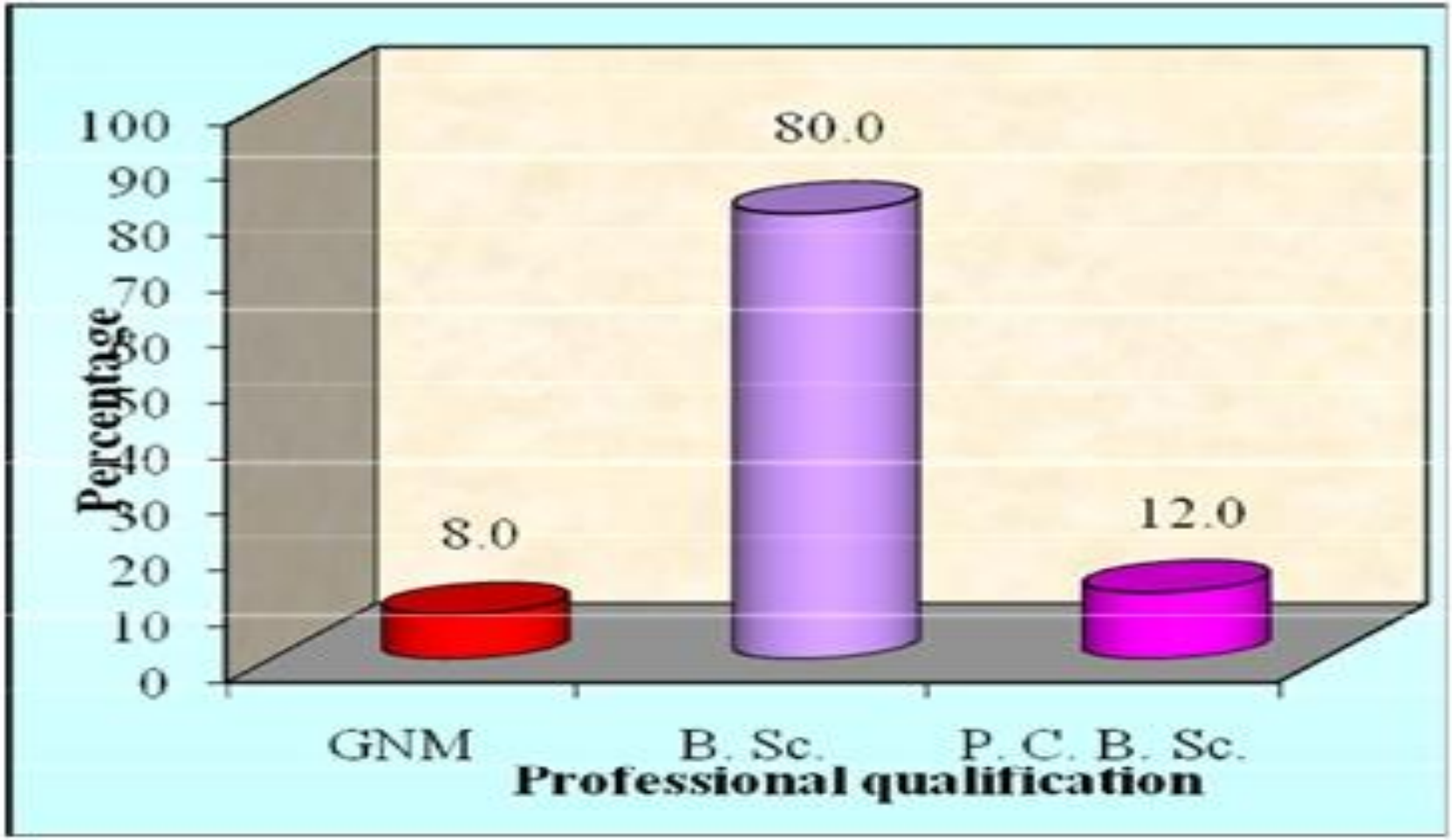

Fig. 5 Distribution of Demographic Variable according to Educational Status of ICU Staff Nurses

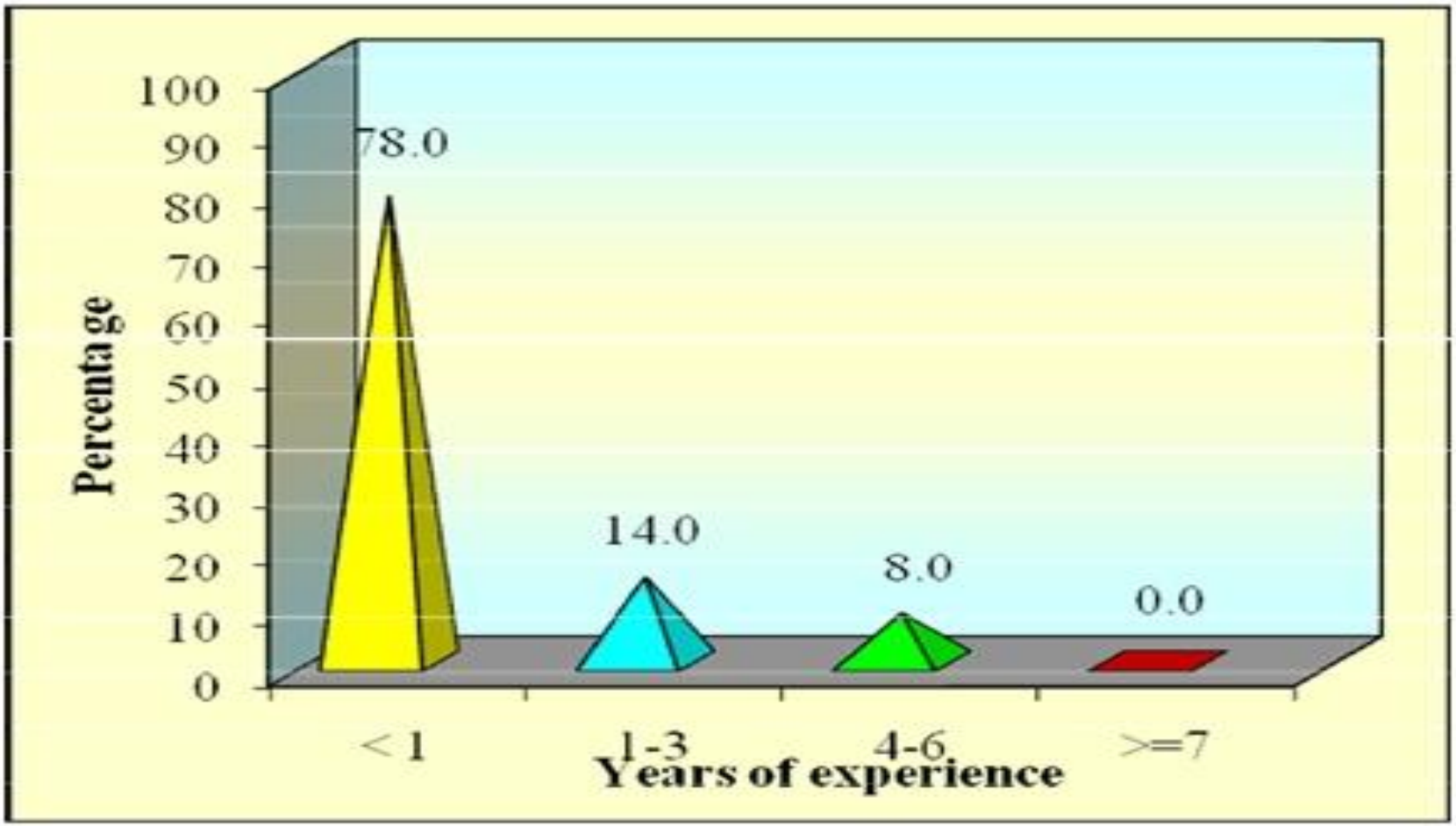

Fig. 6 Distribution of Demographic Variable according to grade of ICU Staff Nurses

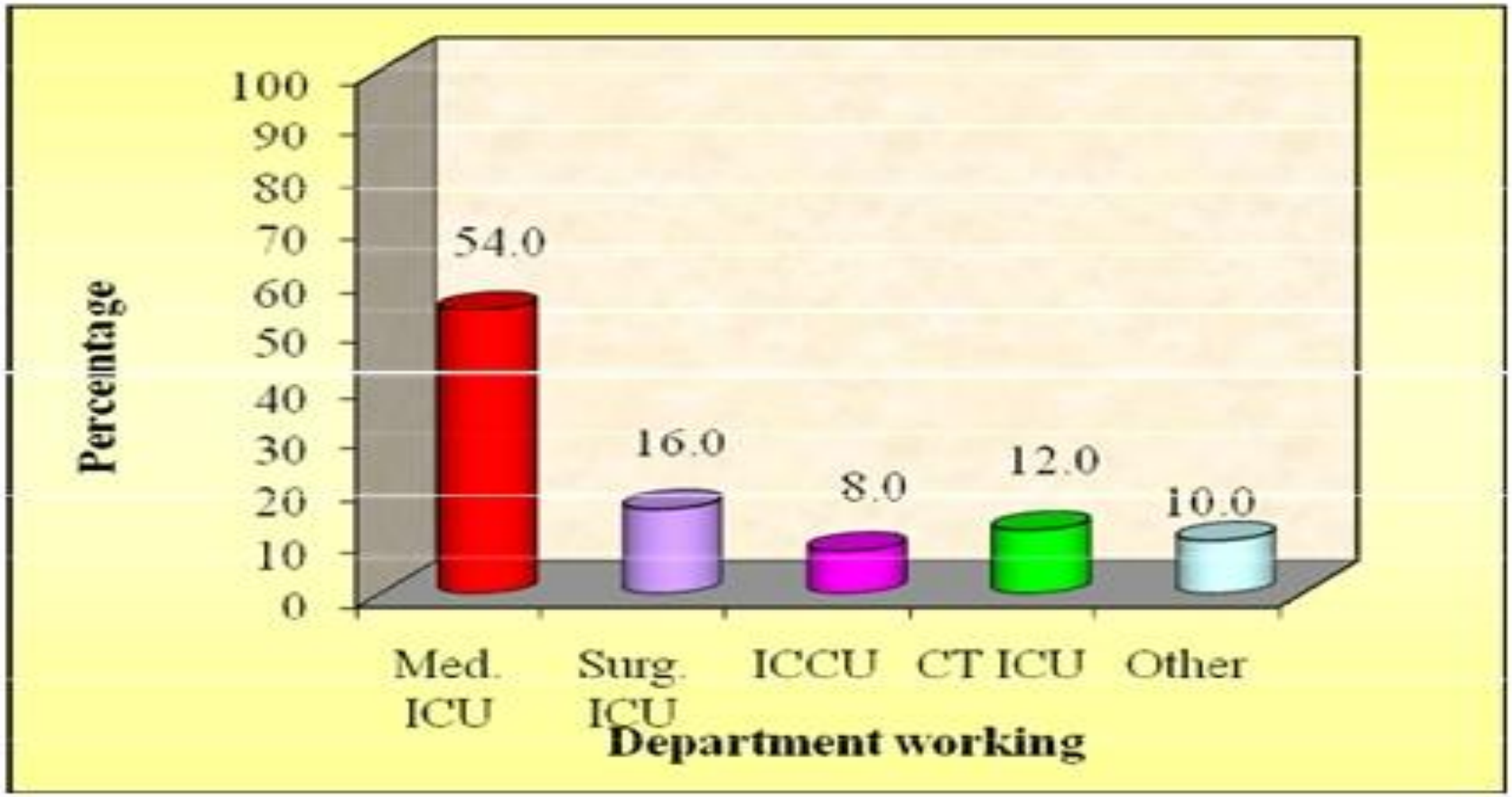

Fig. 7 Distribution of Demographic Variable according to

Department of Working of ICU Staff Nurses

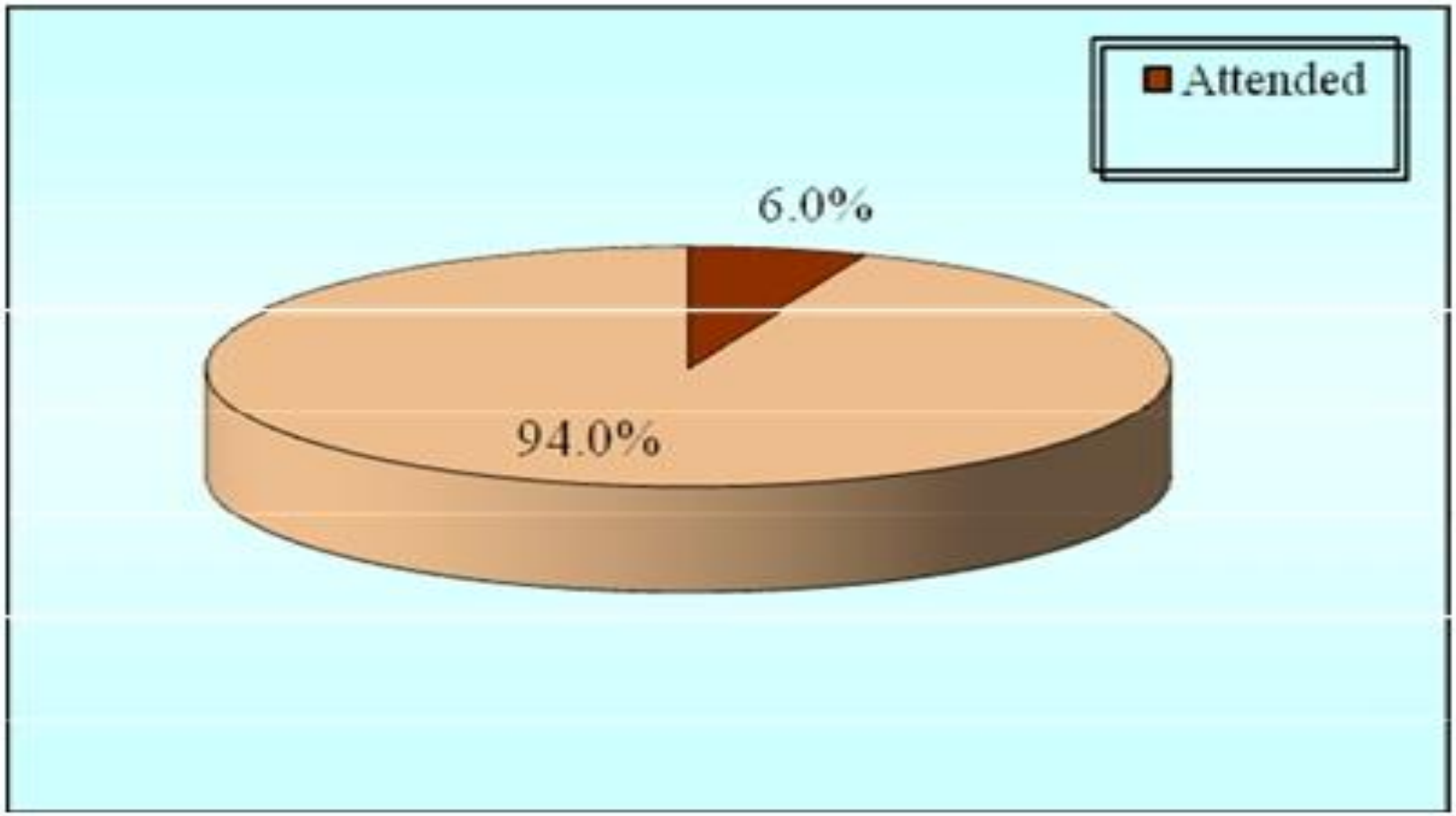

Fig. 8 Distribution of Demographic variable according

to in service education of ICU Staff Nurses

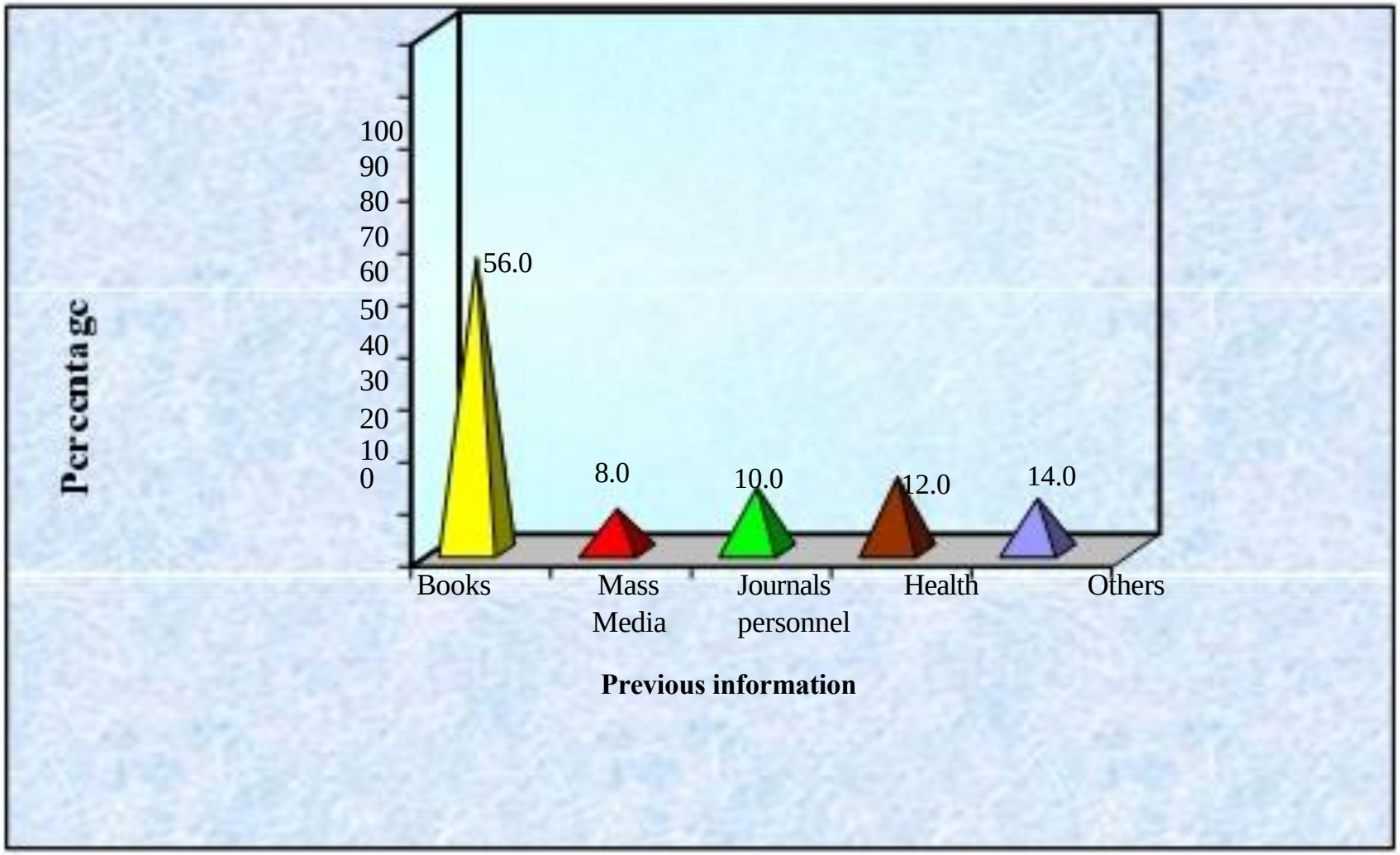

Fig. 9 Distribution of Demographic Variable according to Source of Information on bloodstream infection related to Central Venous Catheter insertion

SECTION - 11

Table 2 : Frequency and percentage distribution of pre test and post test score on knowledge of staff nurses on prevention of blood stream infection Following CVC insertion

Sl.no	Level of knowledge	Pre test		Post test	
		f	%	f	%
1	In adequate	37	37%	0	0%
2	Moderate adequate	13	13%	12%	12%
3	Adequate	0	0%	38%	38%

Table 2

This section deals with the analysis and interpretation of data to assess the pre test knowledge of staff nurses on prevention of blood stream infection following central venous catheter insertion. During the pre test 37 (37%) of staff nurses had inadequate knowledge and 13(13%) of staff nurses had moderately adequate knowledge during post test 12(12%) had moderately adequate knowledge and 38(38%) had adequate knowledge regarding CVC insertion.

SECTION - III

Table 3: Distribution of statistical value of pre test and post test knowledge regarding prevention of blood stream infection Following CVC insertion

Sl.no	Knowledge	Mean	S.D	"t" value
1	Pre test	4.73	1.75	12.175
2	Post test	11.85	1.89	

Significant at 0.05 level

Table 3 shows that the calculated value of "t" value = 12.175 at 49 degree of freedom significant at 0.05 level. Which is greater than the expected table value t=1.6604 .This source that there was a significant deference between pre test and post test score of knowledge level about CVC insertion.

SECTION - IV

Table 4 Association of selected demographic variables and knowledge score of the subjects n=50

Knowledge score				
Sl.no	**Variable**	**Below Mean**	**Above Mean**	χ^2
1.	**Age (years)**			
	a.21-25	21	22	0.000
	b.26-30	4	3	
2.	**Gender**			
	a.Male	4	6	0.125
	b.Female	21	19	
3.	**Professional qualification**			
	a.GNM	0	4	0.055*
	b.Others	25	21	
4.	**Years of experience**			
	a.< 1 year	21	18	0.466
	b.≥ 1 year	4	7	
5.	**Department working**			
	a.Med./Surg. ICU	20	15	2.381
	b.Others	5	10	
6.	**Attended any in-service education programmes on infection** control?			
	a.Yes	1	2	0.000
	b.No	24	23	
7.	**Information on bloodstream infection related to central venous catheter**			
	a.Books & mass media	16	18	0.368
	b.Others	9	7	

CHAPTER-V

RESULTS AND DISCUSSION

This chapter presents the major findings of this study and discussion in relation to similar studies conducted by other researchers. The findings of the present study have been discussed under different headings with relevance to the objectives, findings and correlations with results of other similar studies.

The first objective was to assess the level of knowledge among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

Pre test and post test score was it shows that there was the significant difference between pre test and post test it implies that there was the inadequate knowledge regarding prevention of bloodstream infection following central venous catheter insertion.

Karen.et.al(2010) conducted a study on non randomized study was conducted on peripherally inserted catheters may lower the incidence of catheter-related bloodstream infections in patients in surgical intensive care unit in the Southern Medical Centre at Texas in 2010. Non-randomized sampling technique is used for data collection with sample size 121 patients. Multivariable regression was performed to identify predictors of CR-BSI. Results were 13 CVC infections and one PICC infection, resulting in an infection rate of 6.0/1,000 catheter-days for central venous catheters and 2.2/1,000 for PICCs. The infected PICC was in place for 19 days, whereas the remainder of the PICCs were in place a mean of 14-17 days. Logistic regression demonstrated that line days was the only independent predictor of central venous catheters infection (p=0.015) These results suggest that minimizing the duration of central venous

access and substituting PICC for central venous catheters may reduce the incidence of CR-BSI in long-stay SICU patients.

The second objective was to deliver the planned teaching programme regarding prevention of bloodstream infection following central venous catheter insertion.

Measures were provided by the researcher the improve the knowledge regarding prevention of bloodstream infection following central venous catheter insertion by using powerpoint presentation for 45 minutes it was found to be effective as there were cooperative, communicative and clarifying the doubts regarding central venous catheter insertion.

Johor Bahru (2007). conducted a study on Out of the 655 central venous catheters in 496 patients in the intensive care unit catheter-related-bloodstream infection was diagnosedin 38 catheters. The majority of the central venous catheters were inserted via the subclavian ortheinternal jugular routes and there was no statistical difference in CR-BSI between them ($p = 0.83$).

Third objectrives was to evaluate the effectiveness of the planned teaching programme among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

The obtained "t" value for the knowledge was the table value was .Hence the calculated value was high when compare to table. It indicates that the knowledge regarding prevention of bloodstream infection following central venous catheter insertion was significantly improved.

Sharma (2010) conducted a study on case study was conducted on catheter associated bloodstream infection caused by R. radiobacter in coronary care unit of a tertiary care hospital at Jaipur, India in 2010. Data was collected from a 51year old male admitted in the coronary care unit. A central venous catheter was inserted in the internal jugular vein, the patient developed fever after 48 hours of central venous catheters insertion.

The fourth objectives was to associate of pre-test knowledge score with selected demographic variables.

The demographic variable namely age in years sex, educational status year of experience, department of working, in service education on infection control reveals that there is no significant association between the post test knowledge and demographic variables .

CHAPTER - VI

SUMMARY, CONCLUSION, NURSING IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

Summary

Intravascular catheters have become essential devices for the management of critically and chronically ill patients. However, their usage is associated with serious infectious complications. Most central venous catheter related infections are preventable, and different measures have been implemented to reduce the risk for catheter-related bloodstream infection including maximal barrier precautions during catheter insertion, catheter site maintenance, and hub handling. Registered nurses require specific education and training to gain the knowledge, assessment skills and technical expertise required to manage the care for patients who have central venous access devices and the device-related complications that patients may experience.

Statement of the problem

A study to assess the Effectiveness of planned teaching programme on the prevention of bloodstream infection following central venous catheter insertion among staff nurses working in selected hospitals at Coimbatore.

Objectives of the study

1. To determine the level of knowledge among staff nurses on prevention of bloodstream infection following central venous catheter insertion.
2. To evaluate the effectiveness of the planned teaching programme among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

3. To find the association of pre-test knowledge score with selected demographic variables.

Hypotheses

There is a significant difference between pre test and post test score among staff nurses on prevention of bloodstream infection following central venous catheter insertion.

The conceptual framework of the present study developed by the investigator based on the CIPP model of Daniel Stufflebeam (1983). The CIPP model is a simple system model applied to program evaluation. CIPP stands for context evaluation, input evaluation, process evaluation and product evaluation[19]. The present study aims to evaluate the effectiveness of PTP to improve the knowledge of staff nurses on prevention of blood stream infection following CVC insertion.

Pre-experimental, one group pre-test, post-test design was adopted in this study. Study consisted of 50 staff nurses working in ICU. Purposive sampling technique was used to select the sample. The study was conducted in the selected Hospitals at Mangalore. The investigator prepared a structured knowledge questionnaire to assess the pre test knowledge score on prevention of blood stream infection following CVC insertion.

Seven experts validated the tool; there was 100% agreement on all the items but suggestions were given to modify few items. The modifications were then made in the tool. Pre-testing was carried out; respondents found the tool was simple and understanding. Reliability of the tool was established by Karl Pearson coefficient correlation formula prior to the pilot study. Pilot study was conducted on 10 staff nurses working in ICU. The final study was conducted on 50 staff nurses working in

ICU from selected Hospitals at Mangalore. The structured knowledge questionnaire was administered to assess the knowledge of staff nurses on prevention of blood stream infection following CVC insertion. On the same day planned teaching programme was conducted using the LCD. Post-test was conducted on the 8th day using the same tool.

Major Findings of the study

The findings of the study revealed that, the pre-test score ranges from 1-13 with the mean 6.62 and standard deviation 2.338, while there was a considerable increase in the post-test score, range from 17-34 with the mean of 25.00 and standard deviation 4.309.

The effectiveness of planned teaching programme was tested by comparing the pre-test and post-test knowledge scores. The findings showed that there was a significant difference in the pre-test and post-test score of the staff nurses on all areas of prevention of blood stream infection following CVC insertion and it is shown by the calculated 't' value (12.13, 15.40, 14.85, 62.67 and 46.10) in the respective areas.

Chi square test showed that there is no significant association of the pre-test knowledge score with selected demographic variables.

On the whole, the present study was really an enriching experience for the investigator. It also helped a great deal to explore and improve the knowledge of the investigator as well that of staff nurses. The constant encouragement, timely corrections and guidance of the guide, cooperation and interest of the respondents to participate in the study and the help and support received from the persons who were in charge of the institution contribute to the fruitful completion of this study.

Conclusion

Central venous catheters have become a mainstay in the care of critically ill patients but, unfortunately, are associated with a significant risk of bloodstream infections. Most central venous catheter related infections are preventable, and different measures have been implemented to reduce the risk of catheter-related bloodstream infection including maximal barrier precautions during catheter insertion, catheter site maintenance, and hub handling.

The main purpose of this study is to determine the knowledge of staff nurses on prevention of blood stream infection following central venous catheter insertion. Nurses are the first come in contact with patients with central venous catheter. Their demanding role expects of them to be well-trained, competent and confident in order to prevent the blood stream infections. Knowledge about the prevention of blood stream infection is essential to improve the outcome of patient with central venous catheter. A planned education programme on prevention of blood stream infection following central venous catheter insertion provides staff nurses with knowledge needed to be competent enough to handle patients with central venous catheter.

On the basis of the findings of the study, the following conclusions have been drawn:

- Analysis of the baseline factors of the sample revealed that highest percentage (86%) of sample was in the age group of 21-25 years, majority of sample (80%) were females, most of them (80%) were B. Sc nurse, 78% have < 1 years of experience, 54% were working in Medical ICU, 94% were not attended in- service education on infection control and 56% of the samples were got information on bloodstream infection related to central venous catheter.

- Distribution of staff nurses according to their level of knowledge showed that most of the subjects (86%) during pre-test had poor knowledge, 14% had moderate knowledge, whereas in the post test 68% had good knowledge, 30% had very good knowledge and none of them had poor knowledge on prevention of blood stream infection following CVC insertion.

- The planned teaching programme was found to be an effective strategy to improve knowledge among staff nurses on prevention of blood stream infection following CVC insertion.

- All the subjects in the study group gained knowledge in different areas of prevention of blood stream infection following CVC insertion. The pre-test score was apparently less than the post-test score. The mean post-test knowledge score was apparently higher (25) than the mean pre-test knowledge score (6.62). This shows that there was apparent increase in the post-test mean knowledge scores after the planned teaching programme.

- There was no significant association of the pre-test knowledge score with selected demographic variables like age, gender, professional qualification, years of experience, department of working, attended in- service education on infection control and previous information on blood stream infection related to CVC.

Nursing Implications

The findings of the study have implications in various areas of nursing education, practice and administration and research.

Nursing education

Staff nurses and student nurses should be encouraged to practice care of patients with CVC. The present study was conducted to find the effectiveness of PTP on prevention of blood steam infection following CVC insertion. In order to achieve this, diploma and degree curriculum should include prevention of blood stream infection related to CVC in Medical Surgical Nursing. The student nurses from school of nursing and college of nursing should be encouraged to attend specialised courses and seminars regarding prevention of blood stream infection following CVC insertion. Nursing schools, colleges and teachers should come forward and encourage the continuing education on prevention of blood stream infection following CVC insertion.

Nursing practice

People with life-threatening injuries and illnesses need critical care. Critical care involves close, constant attention by a team of specially-trained health professionals. Monitors, intravenous tubes, feeding tubes, catheters, ventilators and other equipment are common in critical care units. These can sustain life but can also increase the risk of infection. There is great degree of deficiency existing in the practice of care of patients with CVC. The correction of deficiency needs to be an ongoing process.

Critical care nurses should take effort to keep up to date knowledge in care of patients with CVC. Efforts must be made by all staff nurses to increase knowledge, practice, and awareness regarding prevention of blood stream infection following

CVC insertion. The PTP prepared in the present study is one of the means to enhance the practice through appropriate skill and knowledge. It helps the inexperienced future nurses to act efficiently in an actual emergency situation. This PTP can be a means to orient and refresh the knowledge of staff nurses.

Nursing administration

Nursing has a direct impact on the society and health of patients. The findings of the study could be used by the nurse administrators to take steps in formulating policies to sensitise the nurses through PTP in the hospital settings. Nurse administrators can involve staff nurses as "change agents" in creating awareness programme to the health personnel. She should take effort to provide training on prevention of blood stream infection following central venous catheter insertion. There is a need to develop policies and protocols for care of patients with CVC and ensuring that they are being implemented.

Nursing research

Further research is necessary to assess knowledge and skill of nurses regarding prevention of blood stream infection following central venous catheter insertion and imparting knowledge which helps the ICU nurses to provide quality care to the patient with CVC. Use of research findings should become part of the quality assurance evaluations to enhance individual profession as a whole. There is still a lot of scope for exploring more on this topic. Research could be conducted on a larger sample with a view to improve the practice of use of sterile techniques.

Limitations

- The study was confined to only 50 staff nurses working in different ICU which resulted in reduced power in statistical analysis.
- The study did not use a control group.
- The limited sample size limited the generalization of the study findings.
- The questionnaire with multiple choice questions might have prompted the staff nurses to give responses. Hence the possibility of getting average or good score could be a chance factor in this study, which was a limitation of the tool.

Recommendations

On the basis of the findings of the study, the following recommendations have been made for further study:

- A similar study can be conducted on a larger sample, which may help to draw more definite conclusions and make generalizations.
- A similar study can be replicated in different settings.
- A similar study can be conducted on the staff nurses on other aspects of prevention of blood stream infection following central venous catheter.
- A similar study can be carried out using other teaching strategies like video films, computer assisted instructions.
- A study can be designed to explore the knowledge and practice of staff nurses regarding prevention of blood stream infection following central venous catheter.

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ABSTRACT

Statement of the problem "Effectiveness of planned teaching programme on prevention of bloodstream infection following central venous catheter insertion among staff nurses working in selected hospitals at Coimbatore."**Objectives**The objectives of the present study are:a)To determine the level of knowledge among staff nurses on prevention of bloodstream infection following central venous catheter insertion.b)To evaluate the effectiveness of planned teaching programme among staffnurses on prevention of bloodstream infection following central venous catheter insertion.c)To find the association of pre-test knowledge score with selected demographicvariables.**Methodology** An evaluatory research approach with pre-experimental one group pre-test post-test design was used for this study. Fifty staff nurses working in ICU were selected by purposive sampling technique. The tool was validated by seven experts. Reliability was established by Karl Pearson coefficient correlation formula and it was found to be 0.78, which indicated that the tool is reliable. Data were collected using a tructured knowledge questionnaire and analysed using descriptive and inferential statistics.**Results**The result of the study showed that most of the staff nurses (86%) had poor knowledge on prevention of blood stream infection following CVC insertion.

conclusionThe findings of the study indicate that PTP on prevention of blood stream infection following CVC insertion was effective in improving the knowledge of staff nurses working in ICU. So PTP is a most important tool in nursing practice which informs, motivates and maintains skilled nursing care to the patients. Through genuine attempt of teaching to the staff nurses' quality care of patients with CVCs can be improved.

PPG COLLEGE OF NURSING

(A Unit of P. Perichi Gounder Memorial Charitable Trust)

An ISO 9001 : 2008 Certified Institution

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Recognised by Indian Nursing Council, New Delhi. (Cr. No. : 18-1183/2000, INC Resl. No.172) and Tamilnadu Nursing Council, Chennai.

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To

Through

The Principal,

PPG College of Nursing

Coimbatore – 35.

Respected Sir/Madam,

Sub: Seeking Permission for conducting research study

I am a student of M.Sc Nursing in PPG College of Nursing. Our College is affiliated to the Tamilnadu Dr.M.G.R Medical University, Chennai. I have taken the specialization in Medical Surgical Nursing

Topic : A STUDY TO ASSESS THE EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON PREVENTION OF BLOOD STREAM INFECTION FOLLOWING CENTRAL VENOUS CATHETER INSERTION AMONG STAFF NURSES WORKING IN SELECTED HOSPITALS AT COIMBATORE

I request you to kindly permit me to conduct my study in hospital. Hope you will consider my requisition and do the needful.

Thanking you,

Date : Yours Sincerely,

Place :

REQUISITION LETTER FOR CONTENT VALIDITY

From

M.Sc (N) II Year,

PPG College of Nursing,

Coimbatore – 35.

To

Through : The Principal ,PPG College of Nursing

Respected Sir/Madam,

Sub : Requisition for expert opinion and suggestion for content validity of tool

I am a student of M.Sc (N) II Year, PPG College of Nursing. Our College is affiliated to the Tamilnadu Dr.M.G.R Medical University, Chennai. As a partial fulfillment of the M.Sc (N) programme. I am conducting.

A STUDY TO EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON PREVENTION OF BLOOD STREAM INFECTION FOLLOWING CENTRAL VENOUS CATHETER INSERTION AMONG STAFFNURSES WORKING IN SELECTED HOSPITALS AT COIMBATORE

Herewith I have enclosed the developed tool for content validity and for the expert opinion and possible solution. It would be very kind of you to return the same as early as possible.

Thanking you,

Yours Faithfully,

PPG COLLEGE OF NURSING

FORMAT FOR THE CONTENT VALIDITY

Name of the expert :

Address :

Total content for the tool :

Kindly validate each tool and tick wherever applicable

S.No	No. of Tool/Section	Strongly Agree	Agree	O.K	Not Applicable	Need Modification	Remarks

Remarks Signature of the expert with date

LIST OF EXPERTS

1.Dr.PADMAJA.,M.D.,
Department of Medicine,
Ashwin Hospital,
Coimbatore.

2.Prof.KUZHANTHAVEL
KMCH College of Nursing,
Coimbatore.

3.Prof. FUELA
Sri Ramakrishna College of Nursing,
Coimbatore.

4.Prof. K.RAJI
Vice Principal,
K.G.College of Nursing,
Coimbatore.

5.Prof. KAVITHA
Vice Principal,
Ganga College of Nursing,
Coimbatore.

TOOL

Part I: Demographic Proforma

Instruction: Please read every question carefully and indicate the response that you choose by placing a tick mark (√) in the box against the items given.

1. Age (in years)
   a. 21-25 ( )
   b. 26-30 ( )
   c. 31-35 ( )
   d. Above 35 ( )

2. Sex:
   a. Male ( )
   b. Female ( )

3. Professional qualification
   a. Diploma (N) ( )
   b. B. Sc. (N) ( )
   c. Post Certificate B. Sc. (N) ( )

4. Years of experience
   a. <1 year ( )
   b. 1-3 years ( )
   c. 4-6 years ( )
   d. 7 years above ( )

5. Department of working
   a. Medical ICU ( )
   b. Surgical ICU ( )
   c. ICCU ( )
   d. CT. ICU ( )
   e. Other specify... ( )

6. In-service education on infection control
   a. Attended ( )
   b. Not attended ( )

7. Previous information about prevention of blood stream infection related to central venous catheter
   a. Books ( )
   b. Mass media ( )
   c. Journals ( )
   d. Health personnel ( )
   e. Others, if any specify…. ( )

Part II: Structured Knowledge questionnaire to assess the knowledge level of staff nurses regarding prevention of bloodstream infection following central venous catheter insertion

Instructions

- Kindly answer all the questions.
- Each question has 4 alternatives.
- Only one answer is correct for each question.
- Please read every question carefully and indicate the response that you
- Choose by placing a tick mark (√) in the box against the items given.
- Avoid discussion among co-workers.
- Your answers will be kept confidential.

1. Central venous catheter (CVC) refers to any
   a. Catheter placed in a pulmonary artery. ( )
   b. Intravenous catheter whose tip lie in the subclavian vein ( )
   c. Catheter placed in a cephalic vein ( )
   d. Intravenous catheter whose tip lie in the aorta ( )

2. The following are the indications of CVC ***excep***t
   a. Monitor CVP, long term TPN ( )
   b. Plasmapheresis, dialysis, frequent blood withdrawing ( )
   c. Chemotherapy, long term intravenous antibiotics ( )
   d. Monitor BP, $paco_2$ and arterial pressure ( )

3. For dialysis, the vein used for the central venous access is
   a. Internal jugular vein ( )
   b. Cephalic vein ( )
   c. External jugular vein ( )
   d. Saphenous vein ( )

4. The following are the type of central venous catheter ***except***
   a. Peripherally inserted catheter **( )**
   b. Pulmonary catheter ( )
   c. Tunneled catheter ( )
   d. Implantable ports ( )

5. The type of CVC which has no external parts is
   a. Tunneled ( )
   b. Centrally inserted ( )
   c. PICC ( )
   d. Implantable ( )

6. Type of CVC for long term use is
   a. Centrally inserted CVC ( )
   b. Tunneled CVC ( )
   c. Peripherally inserted CVC ( )
   d. Implantable ports ( )

7. The serious type of blood stream infection with CVC is
   a. Methicillin resistant staphylococcus aures (MRS ( )
   b. Pneumococcal infection ( )
   c. Candida infection ( )
   d. Gram negative bacilli infection ( )

8. One of the complication of CVC insertion is
   a. Fat embolism ( )
   b. Air embolism ( )
   c. Pneumonia ( )
   d. Respiratory infection ( )

9. Complication of centrally inserted (internal jugular) venous catheter is
   a. Redness ( )
   b. Hardening of CVC site ( )
   c. Carotid artery injury ( )
   d. Respiratory infection ( )

10. The complication of CVC in subclavian access is
   a. Pneumothorax ( )
   b. Hemothorax ( )
   c. Pleural effusion ( )
   d. Emphysema ( )

11. Daily assessment of CVC site should be done to detect
   a. Signs of infection ( )
   b. Signs of fluid overload ( )
   c. Signs of pulmonary edema ( )
   d. Signs of respiratory infection ( )

12. Frequency of CVC site dressing is
   a. Once in 7 days ( )
   b. Twice in 7 days ( )
   c. Once in 2 weeks ( )
   d. Twice in 2 weeks ( )

13. Commonly using antimicrobial solution for the CVC site care is
    a. Hydrogen peroxide ( )
    b. Lysol ( )
    c. Povidone-iodine ( )
    d. Dettol ( )

14. The pattern of CVC site cleaning is
    a. Swab beginning at the surrounding areas of CVC ( )
    b. Swab beginning at catheter and moving out in circular manner for 3 cm ( )
    c. Swab beginning at 3cm away from catheter. ( )
    d. Swab beginning at 4 cm away from catheter ( )

15. The exact site of application of povidone -iodine ointment is
    a. Around the catheter ( )
    b. Catheter existing site ( )
    c. Around the dressing ( )
    d. Along the dressing ( )

16. After cleaning, the CVC site to be
    a. Kept open ( )
    b. Dressed with ointment or solution ( )
    c. Powdered ( )
    d. Covered with cloth ( )

17. Labeling of the CVC site after dressing to be done stating
    a. Date, time and name of ointment ( )
    b. Date and time insertion of CVC ( )
    c. Type of ointment used ( )
    d. Name and expiry date of CVC ( )

18. Catheter cap of CVC should be changed every
    a. 1-3 days ( )
    b. 4-6 days ( )
    c. 7-9 days ( )
    d. 10-12 days ( )

19. The amount of heparnized normal saline for each flushing is
    a. 2 ml ( )
    b. 5 ml ( )
    c. 10 ml ( )
    d. 20 ml ( )

20. Heparanized IV solution used in flushing system is to prevent
    a. Bleeding ( )
    b. Air emboli ( )
    c. Ventricular dysrhythmia ( )
    d. Thrombus formation ( )

21. The frequency Of CVC flushing with heparin saline is
    a. Every 12hr ( )
    b. Two hourly ( )
    c. Each day ( )
    d. Once in a week ( )

22. After each administration of any medicine through CVC must be flushed with
    a. Normal saline ( )
    b. Dextrose water ( )
    c. Ringer Lactate solution ( )
    d. Water ( )

23. At the time of flushing of CVC to remember that
    a. Middle lumen to be flushed ( )
    b. All the lumen to be flushed ( )
    c. Only one lumen to be flushed ( )
    d. Side lumen to be flushed ( )

24. The units of heparin used to heparanize the IV solution per ml is
    a. 1-2 ( )
    b. 3-5 ( )
    c. 6-8 ( )
    d. 9-11 ( )

25. In peripheral central venous catheter insertion (PIC, the inserted arm is not to be used for
    a. Blood withdrawal ( )
    b. Intramuscular injection ( )
    c. BP monitoring ( )
    d. Blood sugar monitoring ( )

26. When taking care of patient with PICC, the nurse should not allow to
    a. Flex the arm of patient ( )
    b. Immerse arm in the water ( )
    c. Apply oil ( )
    d. Write ( )

27. Patency of CVC can be find out by

a. Administering TPN ( )
b. Withdrawing blood ( )
c. Infusion of fluids ( )
d. Setting the rate of infusion ( )

28. Correct position of CVC tip is to be confirmed by

a. An X-ray ( )
b. Withdrawal of blood ( )
c. Resistance ( )
d. Length of catheter ( )

29. Before infusion ,the port of CVC should be cleaned with

a. Cotton ( )
b. Povidone-iodine ( )
c. Gauze ( )
d. Alcohol swab ( )

30. Handling of CVC must be with

a. Sterile glove ( )
b. Artery forceps ( )
c. Cloth ( )
d. Cotton ( )

31. To prevent CVC related blood stream infection is to

a. Avoid use of multiple lumen ( )
b. Avoid unnecessary handling ( )
c. Flush frequently ( )
d. Keep lumen of CVC close to the patient ( )

32. After the administration of medicine through CVC the syringes to be

a. Used for next time ( )
b. Used for blood withdrawal ( )
c. Discarded ( )
d. Used for same medicine for other patients ( )

33. Administration sets including extension tubing should replace every

a. 12 hours ( )
b. 48 hours ( )
c. 72 hours ( )
d. 24 hours ( )

34. Replace administration sets transfusing blood, blood products, or lipid containing solutions

a. 24 hours ( )
b. 72 hours ( )
c. 42 hours ( )
d. 12 hours ( )

35. Antibiotics prophylaxis has to be given

a. Before the procedure ( )
b. After the procedure ( )
c. At the time of procedure ( )
d. One day before ( )

36. Sign of CVC exit site infection is

a. Cyanosis ( )
b. Erythema ( )
c. Macules ( )
d. Blisters ( )

ANSWER KEY

Q. No.	Answer	Q. No.	Answer
1	b	19	C
2	d	20	D
3	a	21	A
4	b	22	A
5	d	23	B
6	b	24	A
7	a	25	C
8	b	26	B
9	c	27	B
10	a	28	A
11	a	29	D
12	b	30	A
13	c	31	B
14	b	32	C
15	b	33	C
16	b	34	A
17	a	35	A
18	b	36	B

LESSON PLAN ON PREVENTION OF BLOODSTREAM INFECTION FOLLOWING CENTRAL VENOUS CATHETER INSERTION

Student Teacher:	**301411104**
Topic:	Prevention of bloodstream infection following central venous catheter insertion
Group:	Staff nurses
Duration:	45 minutes
Place:	Selected Hospitals at Coimbatore
Method of teaching:	Lecture cum discussion
Teaching aids:	Power point slides
Previous knowledge:	Staff nurses have some knowledge on prevention of blood stream infection following CVC.

Central objective

On completion of the planned teaching programme staff nurses will gain knowledge regarding prevention of blood stream infection following CVC insertion and apply this knowledge in their daily practice.

Specific objectives

At the end of the planned teaching programme the staff nurses will be able to:

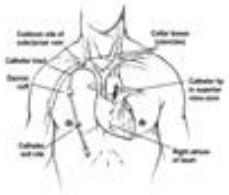
- define central venous catheter.
- list down the indications of CVC.
- enlist the types of CVC.
- identify type of CVC associated infection.
- list down the complication of CVC insertion.
- explain the nursing care following CVC insertion.
- enumerate the prevention of blood stream infection following CVC insertion.

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
1	To introduce the topic	**Introduction** Central venous catheters are used in a wide variety of settings. In acute care they enable rapid and reliable intravenous administration of drugs and fluids and are used to monitor central venous pressure. In other areas, such as cancer care, they may be used for patients undergoing long term, continuous or repeated intravenous treatments, such as chemotherapy, and blood sampling. Meticulous nursing care of central venous line is expected to minimize the associated nosocomial infections where the care is sub optional. The ICU nurses can play a pivotal role in preventing blood stream infections related to CVC.	Researcher introduces the topic through the lecture method	Group actively participates in the teaching	Power point	
2	define central venous catheter	**Definition** The term central venous catheter refers to any intravenous catheter whose tip lie in a large central vein and the tip of the catheter should be placed in the superior vena cava, just above the right atrium, where the blood flow around the catheter is far greater than in a peripheral vein.	Explain the definition of CVC	Listens, observes	Power point	What are the sites of CVC insertion
7	list down the indications of CVC	**Indications** Indications for the use of central lines include: • Monitoring of the central venous pressure (CVP) in acutely ill patients to quantify fluid balance • Long-term Intravenous antibiotics	Lecture cum discussion	Writes down the notes, listens.	Power point	What are the drugs cause phlebitis

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation

		- Long-term parenteral nutrition especially in chronically ill patients
		- Long-term pain medications
		- Chemotherapy
		- Drugs that are prone to cause phlebitis in peripheral veins (caustic), such as:
		  - Calcium chloride
		  - Chemotherapy
		  - Hypertonic saline
		  - Potassium chloride
		  - Amiodarone
		- Plasmapheresis
		- Dialysis
		- Frequent blood draws
		- Frequent or persistent requirement for intravenous access
		- Need for intravenous therapy when peripheral venous access is impossible
		  - Blood
		  - Medication
		  - Rehydration				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
5	enlist the types of CVC	□ Venous access for vasoactive and irritating drugs. □ Insertion of pulmonary artery catheters. □ Insertion of intravenous spacing wires **Types** 1. Centrally inserted central venous catheter 2. Tunneled central venous catheter 3. Peripherally inserted central venous catheter(PICCs) 4. Implantable ports 1. **Centrally inserted central venous catheter:** It is most commonly used for patients in acute settings where the catheter will be needed only for a few days or week. These lines are usually inserted via the subclavian, jugular, femoral vein and secured to the patient's skin using non dissoluble sutures. They may have single or multiple lumens and each lumen fitted with a clamp. 	Lecture cum discussion	Asking doubts, Listens	Power point	Which is the long term CVC?

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		2. **Tunneled central venous catheter:** They are large bore silicon catheter intended for longer term use in patients requiring multiple infusions of fluid, blood products, drugs or total parentral nutrition. They provide access for routine blood sampling. When inserted , one end of catheter is introduced into a vein (usually the cephialic, subclavian, internal or external jugular vein) and threaded into the superior venacava .the other end is tunneled under the skin and pulled through, so the exit site is some distance from the point of insertion.  3. **Peripherally inserted central venous catheter (PICCs):** A peripherally inserted central catheter is a fine - bore central venous catheter inserted into a peripheral vein (usually the basic or cephalic) and threaded towards superior venacava. Usually dominant arm is recommended as the site for inserting peripherally inserted central catheter to reduce the risk of dependent oedema. 				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
5	identify the types of CVC associated infections	4. **Implantable ports:** It has no external parts. Instead of protruding from the patient's skin, the end of the catheter is attached to a self-sealing injection port implanted under the skin on the patient's chest.  **CVC associated infections** **Catheter colonization**: Growth of organisms from a catheter segment by either semi quantitative or quantitative culture. **Catheter-related bloodstream infection**: Isolation of the same organism from a blood culture and from a semi quantitative or quantitative culture of a catheter segment, accompanied by clinical symptoms of bloodstream infection without any other apparent source of infection. **Exit-site infection**: Erythema, tenderness, induration, or purulence within 2 cm of the exit site of the catheter.	Lecture cum discussion	Listens. Observes.	Power point	How will you identify CVC associated infections

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
5	list down the complicati on of CVC insertion	**Complications** 1. **Pneumothorax:** Pneumothorax (for central lines placed in the chest); the incidence is thought to be higher with subclavian vein catheterization. 2. **Infection:** All catheters can introduce bacteria into the bloodstream, but CVCs are known for occasionally causing staphylococcus aureus and staphylococcus epidermidis sepsis. 3. **Other complications** □ Air embolism. □ Hemorrhage (bleeding) and formation of a hematoma (bruise) is slightly more common in jugular venous lines than in others. □ Arrhythmia may occur during the insertion process when the wire comes in contact with the endocardium	Lecture cum discussion	Listens, observes	Power point	What are the complica-tions of CVC
10	explain the nursing care following CVC insertion	**Nursing care** A. Daily assessment of CVC site B. CVC site care C. Catheter care and flushing D. Documentation E. Precaution while taking care of patient F. Prevention of infection	Lecture cum discussion	Write down notes, listens	Power point	What is the procedure of CVC care

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		A. **Daily assessment of CVC site** 1. Make patient in a comfortable position and provide privacy if needed. 2. Wash and wear a pair of examination gloves 3. The catheter site should be examined carefully. If there is any purulence or erythema the catheter needs to be removed. 4. Assess the need for dressing change by noting the last dressing change. 5. Assess the timing of the dressing changes as it relates to medication, IV fluid and transfusion schedules 6. Assess the type of central venous access in place in order to obtain the appropriate supplies. 7. Assess the integrity of the skin and for signs of infections or bleeding. B. **CVC site care:** Article needed, a sterile tray containing 1. Povidone iodine 2. Povidone iodine ointment 3. Sterile gauze, tape, or moisture transparent dressing 4. Sponge holding forceps or artery forceps □ Label with date and time of dressing change				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		□ A pair of sterile gloves. □ A pair of examination gloves. □ Kidney tray **Procedure** □ Explain the procedure to the patient. □ Get informed consent. If the patient is unconscious get consent from the family members. □ Provide privacy. □ Wash hands and put on clean gloves □ Remove old dressing □ Inspect skin at insertion site for redness, tenderness ,or swelling □ Palpate tunneled catheter for presence of Dacron cuff. □ Inspect catheter from hub to skin. □ Remove gloves and put on sterile gloves. □ Clean exit site with povidone iodine swab beginning at the catheter and moving out in a circular manner for 3cm to maintain aseptic technique. □ Apply povidone iodine ointment to exit site				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		□ Apply sterile gauze dressing with tape or transparent dressing □ Label with date and time. □ Secure tubing to client's clothing □ Remove gloves and dispose of all used materials. □ Wash hands. C. **Catheter care and flushing** 1. Change the catheter cap if indicated by protocol, usually every 3 to 7 days. 2. Using 10 ml syringe, flush the catheter with solution of 10 units of heparin after the each use. 3. The frequency of flushes between uses may be very from every 12 hrs. 4. Remember to flush all lumen for multiple-lumen catheters. 5. Flush the port with normal saline or agency protocol recommends for the specific type of port being used. 6. After infusing mediations or solutions, again flush the port with saline before using heparinised saline.				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		D. **Documentation** 1. The date and the dressing was changed 2. The type of ointment and dressing applied 3. The condition of the skin at the site 4. The presence of any exudates or bleeding at the site. E .**Precaution while taking care of patient** Provide clients with the following instructions, a. Do not allow anyone to take blood pressure on the arm in which a PICC line is inserted. b. Wear a medic- alert tag or bracelet if the device is in place for a long period. c. For a PICC, you do not need to restrict activities except do not immerse the arm in water. d. Showering is allowed if the site and catheter are covered by an occlusive dressing e. Teach the signs of infection f. Notify the physician if symptoms of infection develop.				

Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
10	enumerate the prevention of blood stream infection following CVC insertion	**Prevention of infection** ☐ All the procedure must be under sterile precaution. ☐ The nurse prevented an error in central venous catheter placement by verifying the correct catheter for the intended use. ☐ Upon seeing the end of the tubing lying on the floor, she should have started over with a new solution and tubing set up. ☐ The nurse can use the time to assess the old tubing and solutions and check central line insertion site for infection or any complication. ☐ Replace administration sets including extension tubing, add-on devices no more frequently than every 72 hours, unless CABSI is suspected or confirmed. ☐ Replace administration sets transfusing blood, blood products or lipid containing solutions after administration or within 24 hours. ☐ If any doubt about tubing throw it and start over. ☐ Use hand rub before and after the procedure with central line. ☐ Check the site of central venous catheter site then and there. **Conclusion** Central venous catheter is widely used device in variety of settings. Proper nursing care can reduce certain complications like infections. So nurses have a special role in maintaining central venous catheter.	Lecture cum discussion	Listens, observes	Power point	What are the preventive aspects of infection from CVC

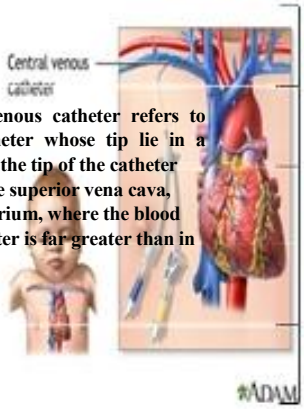
Time	Specific objectives	Content	Teacher's Activity	Learning activity	AV aids	Evaluation
		Reference 1. Black M J. Hawks J H. Medical surgical nursing - clinical management for positive outcome, 8th edition, New Delhi: Saunders publications; 2009 2. Lewis L, Heitkemper M, Dirksen S.Medical surgical nursing - assessment and management of clinical problems. 7th Edition. New Delhi: Elsevier; 2009 3. Smeltzer S, Bare B, Hinkle J, Cheever K. Brunner & suddarth's Text book of medical surgical Nursing.11th edition. New Delhi: Lippincott Williams & Wilkins; 2009 4. Amit. K. S. Recent advances in management of intravascular catheter related infections. Indian journal of medical & paediatric oncology :(26)1 2005,				

MEANING

- A central venous catheter (central line, CVC, central venous line or central venous access catheter) is a catheter placed into a large vein in the neck (internal jugular vein), chest (subclavian vein) or groin (femoral vein).

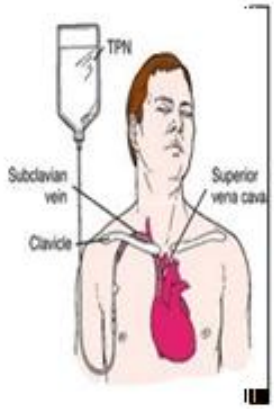
DEFINITION

- The term central venous catheter refers to any intravenous catheter whose tip lie in a large central vein and the tip of the catheter should be placed in the superior vena cava, just above the right atrium, where the blood flow around the catheter is far greater than in a peripheral vein.



INDICATIONS

- Central venous pressure (CVP) monitoring
- Long-term Intravenous antibiotics
- Long-term parenteral nutrition.
- Long-term pain medications



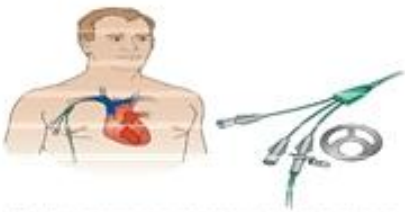
CONT..

- Chemotherapy
- Plasmapheresis
- Dialysis

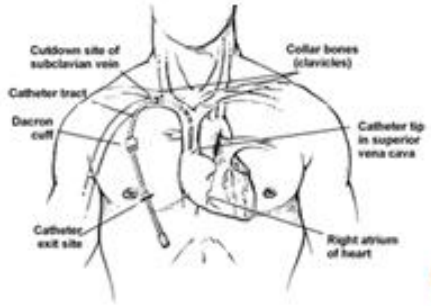
CONT..

- For intravenous access.
- Frequent blood draws.
- Venous access for vasoactive and irritating drugs
- Insertion of pulmonary artery catheters.

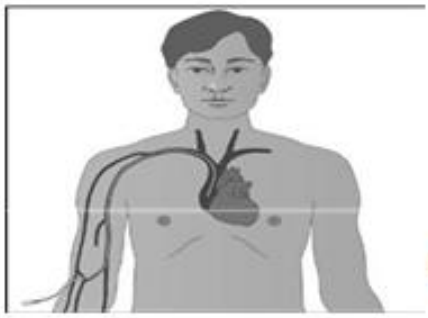
CENTRALLY INSERTED CENTRAL VENOUS CATHETER



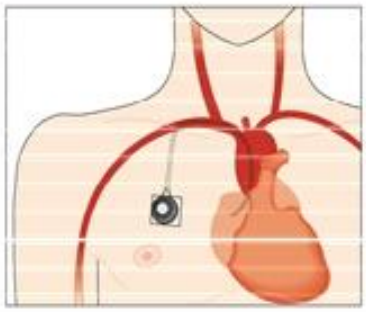
TUNNELED CENTRAL VENOUS CATHETER



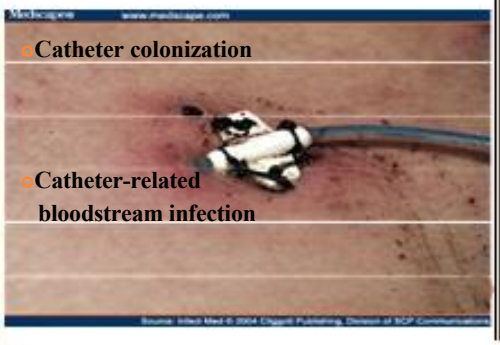
PERIPHERALLY INSERTED CENTRAL VENOUS CATHETER(PICCS)



IMPLANTABLE PORTS



CVC ASSOCIATED INFECTIONS



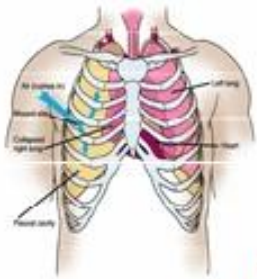
- Catheter colonization
- Catheter-related bloodstream infection

CONT…

- Exit-site infection

COMPLICATIONS

- Pneumothorax
- Carotid artery injury
- Infection



CONT..

- Air embolism
- Arrythmia

CONT..

- Haemorrhage

NURSING CARE

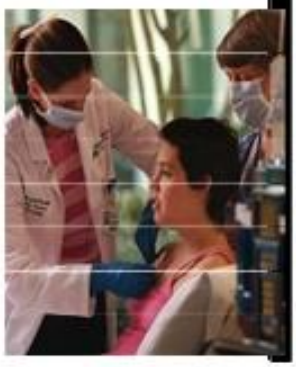
- Daily assessment of CVC site
- CVC site care
- Catheter care and flushing
- Documentation
- Precaution while taking care of patient.
- Prevention of infection

DAILY ASSESSMENT OF CVC SITE

- Make patient in a comfortable position.
- Wash and wear a pair of examination gloves.
- The catheter site should be examined carefully.
- Assess the need for dressing change.

CONT..

- Assess the timing of the dressing changes.
- Assess the type of central venous access.
- Assess the integrity of the skin and for signs of infections or bleeding.



CVC SITE CARE

A sterile tray containing..
Sterile gauze, tape, transparent dressing

- Label
- A pair of sterile gloves.
- A pair of examination gloves.

CONT..

- Povidone iodine
- Sponge holding forceps or artery forceps.
- Kidney tray

PROCEDURE

- Explain the procedure to the patient.
- Get informed consent.
- Provide privacy.
- Wash hands and put on clean gloves.
- Remove old dressing

CONT..

- Inspect skin at insertion site.
- Palpate tunneled catheter.
- Inspect catheter from hub to skin.
- Remove gloves and put on sterile gloves.

CONT….

- Clean exit site with povidone iodine .
- Swab beginning at the catheter and moving out in a circular manner for 3cm.

CONT..

- Apply povidone iodine ointment to exit site
- Apply sterile gauze dressing with tape or transparent dressing

CONT..

- Label with date and time.
- Secure tubing to client's clothing.
- Remove gloves and dispose of all used materials.
- Wash hands.

CATHETER CARE AND FLUSHING

- Change the catheter cap, usually every 3 to 7 days.
- Using 10 ml syringe, flush the catheter with solution of 10 units of heparin after the each use.
- The frequency of flushes between uses may be very from every 12 hrs.

CONT..

- Flush all lumen for multiple-lumen catheters.
- Flush the port with normal saline

DOCUMENTATION

- The date and time.
- The type of ointment and dressing applied.
- The condition of the skin at the site.
- The presence of any exudates or bleeding at the site.

PRECAUTIONS

- Not to take blood pressure on the arm with a PICC line
- Wear a medic- alert tag or bracelet .
- For a PICC, do not immerse the arm in water.

CONT..

- Showering is allowed if the site and catheter are covered by an occlusive dressing.
- Teach the signs of infection.
- Notify the physician if symptoms of infection develops.

PREVENTION OF INFECTION

- Use sterile technique.
- Upon seeing the end of the tubing lying on the floor, start with a new solution and tubing set up.
- If any doubt about tubing throw it and start over.

CONT..

- The nurse to assess the old tubing and solutions.
- Check the central line insertion site for infection or any complication.
- Replace administration sets every 72 hours, unless CABSI is suspected or confirmed.

CONT…

- Replace administration sets transfusing blood products within 24 hours.
- Use hand rub before and after the procedure with central line.
- Check the site of central venous catheter site then and there.

A STUDY TO ASSESS THE EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON PREVENTION OF BLOOD STREAM INFECTION FOLLOWING CENTRAL VENOUS CATHETER INSERTION AMONG STAFF NURSES WORKING IN SELECTED HOSPITALS AT COIMBATORE